



OFFICE OF THE SECRETARY OF DEFENSE

WASHINGTON, DC 20301

23 OCT 2000

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
ASSISTANT SECRETARIES OF DEFENSE
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTORS OF DEFENSE AGENCIES

SUBJECT: Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

The rewrite of the DoD Directive 5000.1 has caused the cancellation of DoD 5000.2-R. We are in the process of revising and reissuing that Regulation, but it is not yet ready for signature and publication. In order to reduce confusion for those that need to implement the procedures contained in the Regulation, we have created the attached interim guidance that will serve in place of the Regulation until such time as the revised Regulation is signed.

This interim guidance was developed by conforming the last version of the Regulation (change four) to the new DoD Directive 5000.1 and DoD Instruction 5000.2, i.e., removing procedures that now reside in the Instruction and changing the milestone names. No other changes were made. Because we did only the minimum necessary, a number of procedures are not yet fully described. We trust that Program Managers, Program Executive Officers, Acquisition Executives, and their staffs will use their best judgement in applying the procedures in the attachment to their programs in order to comply with the spirit of the new Directive and Instruction.

W. K. Kander

Under Secretary of Defense
(Acquisition, Technology,
& Logistics)

Democracy

Assistant Secretary of Defense
(Command, Control,
Communications, &
Intelligence)

[Handwritten signature]

Director,
Operational
Test &
Evaluation

Attachment:
As stated



ATTACHMENT 1

REFERENCES

- (a) DoD Directive 5000.1, "Defense ***Acquisition System***"
- (b) Additional references, see endnotes

A. REISSUANCE AND PURPOSE

This ***Memorandum***:

1. Establishes a simplified and flexible management framework for translating mission needs into stable, affordable, and well-managed MDAPs and MAIS Acquisition Programs;
2. Sets forth mandatory procedures for MDAPs and MAISs and, specifically where stated, for other than MDAPs or MAISs;
3. Serves as a general model for other than MDAPs or MAISs;
4. Consistent with statutory requirements, authorizes Milestone Decision Authorities (MDAs) to tailor the procedures as they see fit;
5. Implements **DoD Directive 5000.1** (reference (a)), the guidelines of **OMB Circular A-109¹**, and current statutes; and,
6. Is effective immediately.

Authority to change this ***Memorandum*** is hereby delegated to the Under Secretary of Defense (***Acquisition, Technology and Logistics***); Director, Operational Test & Evaluation; and Assistant Secretary of Defense (Command, Control, Communications, and Intelligence). All future changes shall be jointly signed by these three officials.

B. APPLICABILITY AND PRECEDENCE

This ***Memorandum*** applies to:

1. The Office of the Secretary of Defense (OSD), the Military Departments, the Chairman of the Joint Chiefs of Staff, the Unified Combatant Commands, the Defense Agencies, and DoD Field Activities (hereafter referred to collectively as "DoD Components").
2. MDAPs and MAIS Acquisition Programs, and, specifically where stated, less-than-major programs. In some cases, Congress has established mandatory requirements that apply to more than major defense acquisition programs. For example, **10 USC 2366²** mandates live fire testing for covered systems, major munitions, or missile programs, as well as related covered product improvements. Some of these systems may be non-major programs. Thus, whenever this ***Memorandum*** is implementing this type of statute, the ***Memorandum*** applies beyond just MDAPs.

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3. In general, highly sensitive classified programs, cryptologic, and intelligence programs, shall follow the guidance for other programs, depending on their size. The MDA shall approve proposed tailoring. The MDA may waive acquisition documentation requirements, except those required by statute.

C. DEFINITIONS

1. Defense Acquisition Deskbook. The Defense Acquisition Deskbook is an automated repository of information that consists of an electronic Desk Reference Set, a Tool Catalog, and a Forum for the exchange of information. The Reference Set organizes information into two main categories: mandatory guidance and discretionary information.
2. Acquisition Phase. All the tasks and activities needed to bring the program to the next major milestone occur during an acquisition phase. Phases provide a logical means of progressively translating broadly stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and survivable systems. An example of an acquisition phase is Program Definition and Risk Reduction.
3. Acquisition Program. A directed, funded effort designed to provide a new, improved or continuing weapons system or AIS capability in response to a validated operational need. Acquisition programs are divided into different categories that are established to facilitate decentralized decision-making, and execution and compliance with statutory requirements.
4. Automated Information System (AIS). A combination of computer hardware and software, data, or telecommunications, that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software, that are: physically part of, dedicated to, or essential in real time to the mission performance of weapon systems.
5. Integrated Product and Process Development (IPPD). A management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support. One of the key IPPD tenets is multidisciplinary teamwork through Integrated Product Teams (IPTs).
6. Major Automated Information System (MAIS) Acquisition Program. An AIS acquisition program that is (1) designated by ASD(C3I) as a MAIS, or (2) estimated to require program costs in any single year in excess of **\$32** million in fiscal year (FY) **2000** constant dollars, total program costs in excess of **\$126** million in FY **2000** constant dollars, or total life-cycle costs in excess of **\$378** million in FY **2000** constant dollars. MAISs do not include highly sensitive classified programs (as determined by the Secretary of Defense). For the purpose of determining whether an AIS is a MAIS, the following shall be aggregated and considered a single AIS: (1) the separate AISs that constitute a multi-element program; (2) the separate AISs that make up an

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evolutionary or incrementally developed program; or (3) the separate AISs that make up a multi-component AIS program.

7. Major Defense Acquisition Program (MDAP). An acquisition program that is not a highly sensitive classified program (as determined by the Secretary of Defense) and that is: (1) designated by the Under Secretary of Defense (***Acquisition, Technology and Logistics***) (***USD(AT&L)***) as an MDAP, or (2) estimated by the ***USD(AT&L)*** to require an eventual total expenditure for research, development, test and evaluation of more than ***\$365*** million in fiscal year (FY) ***2000*** constant dollars or, for procurement, of more than ***\$2.190*** billion in FY ***2000*** constant dollars (***10 USC 2430³***).
8. Major System. A combination of elements that shall function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. A system shall be considered a major system if it is estimated by the DoD Component Head to require an eventual total expenditure for RDT&E of more than ***\$140*** million in FY ***2000*** constant dollars, or for procurement of more than ***\$660*** million in FY ***2000*** constant dollars, or if designated as major by the DoD Component Head (***10 USC 2302(5)⁴***).
9. Major Milestone. A major milestone is the decision point that separates the phases of an acquisition program. MDAP milestones include, for example, the decisions to authorize entry into the engineering and manufacturing development phase or full rate production. MAIS milestones may include, for example, the decision to begin program definition and risk reduction.
10. Milestone Decision Authority (MDA). The individual designated in accordance with criteria established by the ***USD(AT&L)***, or by the ASD(C3I) for AIS acquisition programs, to approve entry of an acquisition program into the next phase.

Additional definitions appear throughout this ***Memorandum***.

D. **IMPLEMENTATION**

1. This ***Memorandum*** shall not be supplemented by any DoD Component. Department officials shall keep the issuance of any directives, Regulations, policy memoranda, or regulations necessary to implement the mandatory procedures contained herein to a minimum. Department officials shall provide copies of all such issuances to the Under Secretary of Defense (***Acquisition, Technology and Logistics***) (***AT&L***) prior to publication. Waivers or requests for exceptions to the provisions of this ***Memorandum*** shall be submitted to the ***USD(AT&L)*** via the DoD Component Acquisition Executive (CAE). Statutory requirements cannot be waived unless the statute specifically provides for waiver of the stated requirements.
2. Policy memorandums and proposed changes to individual sections of this ***Memorandum*** shall be coordinated with the Director, Acquisition ***Resources and Analysis (ARA)*** prior to Department-wide staffing of the change. The purpose of this

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policy is to maintain administrative control of this ***Memorandum*** and is not intended to imply any approval authority on the part of the Director, ***ARA***.

3. The policies and procedures described in DoD Directive (DoDD) 5000.1 (reference (a)) ***DoD Instruction (DoDI) 5000.2 and this Memorandum*** are mandatory. DoDD 5000.1 (reference (a)), ***DoDI 5000.2 and this Memorandum*** are located in the Reference Set of the Defense Acquisition Deskbook. Discretionary acquisition information, practical advice, and lessons learned are also located in the Reference Set.
4. MDAs for other than MDAPs or MAISs shall promulgate mandatory procedures for those programs unless the Component Acquisition Executive has already promulgated such procedures. These procedures shall not exceed the requirements for MDAPs and MAIS Acquisition Programs established in this ***Memorandum*** (i.e., no DoD Component shall add mandatory requirements to those specified in this ***Memorandum***).
5. Unless otherwise directed by the MDA, program documentation prepared in compliance with the requirements of DoDI ***5000.2 or DoDI 8120.2***, as of the date of signature of this ***Memorandum***, shall not be updated solely to satisfy the requirements of this ***Memorandum***.

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2. Program Definition
3. Program Structure
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¹ Office of Management and Budget Circular A-109, Major Systems Acquisition, April 5, 1976

² Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

³ Title 10, United States Code, Section 2430, Major defense acquisition program defined (these amounts have been increased pursuant to the statutory notice provided to Congress)

⁴ Title 10, United States Code, Section 2302(5), Definitions

Part 1

Acquisition Management Process ***[Deleted]***

Part 2

Program Definition

2.1 Purpose

Program definition is the process of translating broadly stated mission needs into a set of operational requirements from which specific performance specifications are derived. Use of the mandatory procedures in this part will help ensure that Acquisition Category (ACAT) I and ACAT IA programs approved to proceed into engineering and manufacturing development, and ACAT I programs approaching full-rate production, are well-defined and carefully structured to represent a judicious balance of cost, schedule, and performance; available technology; and affordability constraints. Not all acquisition programs are initiated in response to a specific military threat. Economic benefits, new technological opportunities, or other considerations may cause new programs to be initiated.

2.2 Intelligence Support*

When acquisition programs are initiated in response to a military threat, they shall be based on authoritative, current, and projected threat information.

1. Threat information, including that contained in program documents, shall be validated by the Defense Intelligence Agency (DIA) for acquisition programs subject to review by the Defense Acquisition Board (DAB).
2. Early and continued collaboration among the intelligence, requirements generation, and acquisition management communities shall be maintained to ensure the timely availability of validated threat information. This collaboration shall include joint examination of critical intelligence categories that could significantly influence the effective operation of the deployed system.

Initial system threat assessments shall be prepared by DoD Components to support program initiation usually at Milestone ***B***, Approval to Begin a New Acquisition Program, and maintained in a current and approved or validated status throughout the acquisition process. These threat projections shall be prepared during each phase for consideration at Milestone decision points. They shall be system-specific to the degree of system definition at the time the assessment is made and address the projected threat at IOC and IOC plus ten years. Minimum elements of the threat assessment are:

1. Key intelligence judgements and significant changes in the threat environment.

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2. Operational threat environment, the threat to be countered, the system specific threat, reactive threat, and technologically feasible threat shall form the central body of the assessment.
3. Fully developed status of the critical intelligence categories. Intelligence production requirements supporting these categories or the employment of systems shall be identified early and included in program plans and cost estimates.
4. Assessment of collection threats to program technologies, impact of technology loss to programs, and identification of essential technologies critical to program success.

*Normally not applicable to ACAT IA programs.

2.2.1 Evaluation of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Support

A C4I support plan shall be prepared for all weapons systems/programs that interface with C4I systems. The C4I Support Plan shall include a system description, employment concept (including targeting, battle damage assessment, and bomb impact assessment requirements), operational support requirements (including C4I, testing, and training), interoperability and connectivity characteristics, management, and scheduling concerns. An evaluation of compatibility, interoperability, integration, and intelligence support for targeting requirements shall be accomplished for all weapons, systems/programs noted above (see **CJCSI 3170.01A¹** and **CJCSI 6212.01B²**). In accordance with **CJCSI 3170.01A³**, C4ISR requirements shall be reviewed and updated, as necessary, at every milestone decision and whenever the concept of operations or intelligence requirements change.

2.3 Requirements Evolution

Department of Defense (DoD) Components shall document performance deficiencies in current capabilities and opportunities to provide new capabilities in a Mission Need Statement (MNS) expressed in broad operational terms. The MNS shall identify and describe the mission contained in the DoD Strategic Plan and the mission deficiency; discuss the results of mission area analysis; describe why non-materiel changes (i.e., doctrine, tactics, etc.) are not adequate to correct the deficiency (**CCA⁴**); identify potential materiel alternatives; identify linkage to the DoD Strategic Plan (**GPRA⁵**); and describe any key boundary conditions and operational environments that may impact satisfying the need such as information operations. The MNS shall be prepared in accordance with **CJCSI 3170.01A⁶** and validated prior to Milestone **A**. System performance objectives and thresholds shall be developed from, and remain consistent with, the initial broad statements of operational capability. The requirements shall be refined at successive milestone decision points, as a consequence of cost as an independent variable (CAIV)-based cost-schedule-performance trade-offs during each phase of the acquisition process.

In the process of refining requirements, key concepts that shall be adhered to include:

1. keeping all reasonable options open and facilitating trade-offs throughout the acquisition process;

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2. avoiding early commitments to system-specific solutions, including those that inhibit future insertion of new technology and commercial or non-developmental items;
3. defining requirements in broad operational capability terms; and
4. using minimum acceptable operational performance (thresholds) to establish operational test criteria.

At each milestone beginning with program initiation (usually Milestone **B**), thresholds and objectives initially expressed as measures of effectiveness or performance and minimum acceptable requirements for the proposed concept or system shall be documented by the user or user's representative in an Operational Requirements Document (ORD) (see **CJCSI 3170.01A**). Thresholds and objectives in the ORD shall be CAIV-based, considering the results of the analysis of alternatives and the impact of affordability constraints. Key Performance Parameters (KPPs), validated by the JROC or cognizant Principal Staff Assistant (PSA), shall be included in the appropriate Acquisition Program Baseline (APB) (see 3.2.2). A KPP is that capability or characteristic so significant that failure to meet the threshold can be cause for the concept or system selection to be reevaluated or the program to be reassessed or terminated. KPPs are extracted from the ORD and included in the APB. User or user representative participation in each acquisition phase is essential.

In addition, the user or user's representative shall work with the Program Manager or other system developer to establish, at program initiation, and refine, at subsequent milestones, CAIV-based cost and performance objectives and critical schedule dates. The CAIV-based parameters and critical schedule dates shall also be included in the APB. For ACAT I programs, the JROC shall evaluate cost and schedule, as well as performance, when considering acquisition programs (**10 USC §181⁷**).

Thresholds and objectives are defined below. The values for an objective or threshold and definitions for any specific parameter contained in the ORD, TEMP, and APB shall be consistent.

1. **Threshold.** The threshold value is the minimum acceptable value that, in the user's judgment, is necessary to satisfy the need. If threshold values are not achieved, program performance is seriously degraded, the program may be too costly, or the program may no longer be timely. The spread between objective and threshold values shall be individually set for each program based on the characteristics of the program (e.g., maturity, risk, etc.).
2. **Objective.** The objective value is that desired by the user and which the PM is attempting to obtain. The objective value could represent an operationally meaningful, time critical, and cost-effective increment above the threshold for each program parameter. Program objectives (parameters, and values) may be refined based on the results of the preceding program phase(s).

2.3.1 Evaluation of Requirements Based on Commercial Market Potential

Researching the potential of the commercial marketplace to meet system performance requirements is an essential element of building a sound set of requirements. In developing system performance requirements, DoD Components shall evaluate how the desired

performance requirements could reasonably be modified to facilitate the use of potential commercial or non-developmental items, components, specifications, open standards, processes, technology, and sources (**10 USC §2377⁸; CCA⁹**). The results of the evaluation shall be included as part of the initial ORD.

2.3.2 Strategic Requirements Considerations

Before establishing new acquisition programs, DoD Components shall address the following questions for ACAT IA programs and (to the extent practicable) ACAT I programs (**CCA¹⁰**):

1. Will the acquisition support core/priority mission functions that need to be performed by the Federal Government?
2. Does the acquisition need to be undertaken by the Department because no alternative private sector or governmental source can better support the function?
3. Will the acquisition support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial, off-the-shelf technology?

2.4 Analysis of Alternatives

An analysis of alternatives is part of the CAIV process and shall be prepared and considered at appropriate milestone decision reviews of ACAT I and ACAT IA programs, beginning with program initiation (usually Milestone **B**). These analyses are intended to:

1. Aid and Document Decisionmaking by illuminating the risk, uncertainty, and the relative advantages and disadvantages of the alternatives being considered. Show the sensitivity of each alternative to possible changes in key assumptions (e.g., threat) or variables (e.g., selected performance capabilities). Where appropriate, include discussion of interoperability and commonality of components/systems that are similar in function to other DoD Component programs or Allied programs. The analysis shall aid decisionmakers in judging whether or not any of the proposed alternatives to an existing system offer sufficient military and/or economic benefit to be worth the cost. There shall be a clear linkage between the analysis of alternatives, system requirements, and system evaluation measures of effectiveness (**CCA¹¹** and **PRA¹²**).
2. Foster Joint Ownership and Afford a Better Understanding of Subsequent Decisions by early identification and discussion of reasonable alternatives among decision-makers and staffs at all levels. The analysis is intended to be quantitatively based, producing discussion on key assumptions and variables.

2.4.1 Preparation Responsibilities

The DoD Component (or PSA office for ACAT IA programs) responsible for the mission area in which a deficiency or opportunity has been identified normally prepares the analysis of alternatives.

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1. The DoD Component Head (or PSA for ACAT IA programs), or as delegated, but not the Program Manager (PM), is responsible for determining the independent activity responsible for preparing the analysis.
2. The lead DoD Component for a joint program is responsible for ensuring that a comprehensive analysis is prepared for the joint program. If the single analysis is to be supplemented by individual DoD Component developed analyses, the lead DoD Component shall ensure that the assumptions and methodologies used are consistent across the analyses.
3. For ACAT ID and ACAT IAM programs, the DoD Component Head or designated official shall ensure coordination with the Under Secretary of Defense (***Acquisition, Technology and Logistics***) (***USD(AT&L)***) or Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD(C3I)) staff, the Joint Staff (or PSA) staff, the D, OT&E staff, and the Director, Program Analysis & Evaluation (PA&E) staff takes place early in the development of the alternatives analysis. The staffs can make valuable contributions by ensuring that the full range of alternatives is considered; organizational and operational plans are developed with input from the Commanders in Chief of the Unified Commands and are consistent with U.S. military strategy; and joint-service issues, such as interoperability, security, and common use, are addressed. To form the basis for development of an analysis plan, the Director, PA&E shall prepare guidance for the analysis of alternatives in coordination with the offices listed above. This guidance shall be issued by ***USD(AT&L)*** or ASD(C³I).

2.4.2 Milestone Decision Reviews

Normally, the DoD Component completes the analysis and documents its findings in preparation for a program initiation decision (usually Milestone ***B***). The Milestone Decision Authority (MDA) may direct updates to the analysis for subsequent decision points, if conditions warrant. For example, an analysis of alternatives may be useful in examining cost performance trades at Milestone ***B***. An analysis of alternatives is unlikely to be required for Milestone ***C***, unless the program or circumstances (e.g., threat, alliances, operating areas, technology) have changed significantly. For ACAT IA programs, the PM shall incorporate the analysis of alternatives into the cost/benefit element structure and process described in 3.5.1.

2.5 Affordability

Affordability is the degree to which the life-cycle cost of an acquisition program is in consonance with the long-range investment and force structure plans of the Department of Defense or individual DoD Components. Affordability procedures establish the basis for fostering greater program stability through the assessment of program affordability and the determination of affordability constraints.

1. Components shall plan programs consistent with the DoD Strategic Plan, and based on realistic projections of likely funding available in the Future Years Defense Program (FYDP) and in years beyond the FYDP.
2. Affordability shall be assessed at each milestone decision point beginning with program initiation (usually Milestone ***B***). No acquisition program shall be approved to

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proceed beyond program initiation unless sufficient resources, including manpower, are programmed in the most recently approved FYDP, or will be programmed in the next Program Objective Memorandum (POM), Budget Estimate Submission (BES), or President's Budget (PB) (**CCA¹³** and **OMB Circular A-11¹⁴**).

3. Cost Analysis Improvement Group (CAIG) reviews shall be used to ensure cost data of sufficient accuracy is available to support reasonable judgments on affordability for ACAT I programs. The manpower estimate for the program shall address manpower affordability in terms of military end-strength and civilian work years. The Cost/Performance IPT (CPIPT) shall ensure that cost and benefit data of sufficient accuracy is available to support reasonable affordability judgments for ACAT IA programs.
4. DoD Component Heads shall consult with the **USD(AT&L)** or the ASD(C3I), as appropriate, on program objective memoranda (POM) and budget estimate submissions (BES) that contain a significant change in funding for, or reflect a significant funding change in, any program subject to review by the DAB or the DoD Chief Information Officer. This consultation shall be accomplished prior to submission of the POM or BES to the Secretary of Defense, as specified in the **USD(AT&L)** Charter, **DoDD 5134.1¹⁵**.

2.5.1 Full Funding of Acquisition Programs Reviewed by the DAB or IT OIPT

When the DAB or IT OIPT reviews a program, the DoD Component Head responsible for the program shall submit to the **USD(AT&L)** or ASD(C3I) the funding for that program contained in the FYDP most recently approved by the Secretary of Defense. The DoD Component Head shall also provide a description of the best possible acquisition strategy that could be implemented with the currently approved program funding along with the preferred DoD component approach if they are different.

If, after the DAB or IT OIPT has reviewed the program, the **USD(AT&L)** or ASD(C3I) concludes that the FYDP funding for the program will not support the program as presented to the DAB or IT OIPT, the DoD Component Head shall commit to incorporate appropriate funding in the next FYDP update.

2.6 Supportability

Supportability factors are integral elements of program performance specifications. However, support requirements are not to be stated as distinct logistics elements, but instead as performance requirements that relate to a system's operational effectiveness, operational suitability, and life-cycle cost reduction (**CCA¹⁶** and **PRA¹⁷**).

2.7 Advanced Concept Technology Demonstrations (ACTDs)

ACTDs are a means of demonstrating the use of emerging or mature technology to address critical military needs. ACTDs themselves are not acquisition programs, although they are designed to provide a residual, usable capability upon completion. If the user determines that additional units are needed beyond the residual capability and that these units can be funded, the additional buys shall constitute an acquisition program with an acquisition category generally commensurate with the dollar value and risk of the additional buy. The nature of the

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acquisition program depends on what additional development, if any, is needed upon completion of the ACTD, (e.g., an ACTD may result in an acquisition program with a short ***System Development and Demonstration (SDD)*** phase or no ***SDD*** phase, depending on the modifications necessary to meet the needs of the user). ACTDs shall conduct CAIV-based cost/schedule/performance tradeoffs throughout their planning and execution.

¹ Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01***A***, "Requirements Generation System ***August 10, 1999***

² CJCS Instruction 6212.01B, Compatibility, Interoperability, and Integration of Command, Control, Communications, Computers, and Intelligence Systems, May 8, 2000

³ Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01***A***, "Requirements Generation ***System, August 10, 1999***

⁴ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5123, Performance And Results-Based Management

⁵ Title 5, United States Code, 306, Strategic Plans (part of Government Performance and Results Act (GPRA))

⁶ CJCSI 3170.01***A***, "Requirements Generation System ***August 10, 1999***

⁷ Title 10, United States Code, 181, Joint Requirements Oversight Council

⁸ Title 10, United States Code, 2377, Preference for acquisition of commercial items

⁹ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control, and 5201, Procurement Procedures

¹⁰ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5113 Performance-Based And Results-Based Management

¹¹ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control

¹² Title 44, United States Code, 3506, Federal agency responsibilities (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

¹³ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control

¹⁴ Office of Management and Budget Circular No. A-11, Part 1, Preparation and Submission of Budget Estimates, June, 1997

¹⁵ Department of Defense Directive 5134.1, "Under Secretary of Defense for ***Acquisition & Technology***" June 8, 1994 (Change 1)

¹⁶ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control

¹⁷ Title 44, United States Code, 3506, Federal agency responsibilities (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

Part 3

Program Structure

3.1 Purpose

The purpose of this part is to identify the elements that are necessary to structure a successful program. These elements are contained in strategies that are proposed by the Program Manager (PM) and approved by the Milestone Decision Authority (MDA) or other appropriate authority. Properly tailored program strategies form the basis for sound management, and provide an historical record of the program's maturation and decision process. Program strategies are based on the exercise of good judgment and common sense, and include innovative ways to achieve program success.

The elements identified in this part address what the program will achieve (program goals), how the program will be developed and/or procured (acquisition strategy), how the program will be evaluated against what was intended (test and evaluation), and what resources will be needed for the program (life-cycle resource estimates).

3.2 Program Goals

Every acquisition program shall establish program goals for the minimum number of cost, schedule, and performance parameters that describe the program. Program goals shall be linked to the DoD Strategic Plan and other appropriate subordinate strategic plans, such as Component and functional strategic plans, and to the Strategic Information Resources Management Plan required by the **Paperwork Reduction Act of 1995**¹. These program goals shall be identified as objectives and thresholds.

3.2.1 Objectives and Thresholds

Each parameter shall include both an objective and a threshold value (see 2.3). Cost, schedule, and performance objectives are developed through the cost as an independent variable (CAIV) process (see 3.3.4). If no objective is specified, the threshold value shall be the objective value. Threshold values shall be individually set for each program based on the characteristics of the program (e.g., maturity, risk, etc.). If the threshold values are not otherwise specified, the threshold value for performance shall be the same as the objective value, the threshold value for schedule shall be the objective value plus six months for ACAT I and three months for ACAT IA, and the threshold value for cost shall be the objective value plus 10 percent. Cost, schedule, and performance may be traded-off within the range between the objective and the threshold (known as the "trade space") without obtaining MDA approval. (See 3.3.4.1 for cost and performance trade-off procedures). Trade-offs outside the trade space (i.e., program parameter changes) may be considered; however, trade-offs outside the trade space shall not be made without the approval of the MDA and ORD approving authority. In addition, key performance parameters validated by the JROC or by a PSA may not be traded-off without JROC approval or PSA review.

3.2.2 Acquisition Program Baselines

Every acquisition program shall establish an Acquisition Program Baseline (APB) to document the cost, schedule, and performance objectives and thresholds of that program

beginning at program initiation. Performance shall include supportability and, as applicable, environmental requirements. For Acquisition Category (ACAT) I programs, the APB implements the requirement in **10 USC §2220(a)(1)² and §2435³** beginning at Milestone ***B***. The format for the APB is included in the Consolidated Acquisition Reporting System (CARS) (see Appendix I).

3.2.2.1 Preparation and Approval

The PM, in coordination with the user, shall prepare the APB at program initiation for ACAT I and ACAT IA programs, at each subsequent major milestone decision, and following a program restructure or an unrecoverable program deviation. The Program Executive Officer (PEO) and the Component Acquisition Executive (CAE), as appropriate, shall concur in the APB. The MDA shall approve the APB. For ACAT I and ACAT IA programs, the MDA shall not approve the APB without the coordination of the Under Secretary of Defense (Comptroller) (**10 USC §2220(a)(2)⁴**) and the Joint Requirements Oversight Council (JROC) or, in the case of ACAT IA programs, the Principal Staff Assistant (PSA) in place of the JROC (where applicable).

3.2.2.2 APB Content

The APB shall contain only the most important cost, schedule, and performance parameters. The most important parameters are those that, if the thresholds are not met, the MDA would require a reevaluation of alternative concepts or design approaches. The total number of cost, schedule, and performance parameters in an APB shall be limited as described below. The values of the parameters shall represent the program as it is expected to be produced or deployed.

1. **Performance.** The specificity and number of performance parameters evolve as the program is better defined. At Milestone ***B***, performance parameters shall be defined in broad terms. Measures of effectiveness or measures of performance shall be used in describing needed capabilities early in a program. More specific program parameters shall be added as necessary to the APB as the program requirements become better defined. The total number of performance parameters shall be the minimum number needed to characterize the major drivers of operational effectiveness and suitability, schedule, technical progress, and cost. This minimum number shall include the key performance parameters described in the ORD and validated by the JROC for inclusion in the APB (see 2.3). The value of an objective or threshold in the APB shall not differ from the value for a like objective or threshold in the ORD. In addition, the definitions for like parameters in the APB and ORD shall be consistent. These performance parameters may not completely define operational effectiveness or suitability. Therefore, the MDA may add additional performance parameters not validated by the JROC. For AIS programs, an important performance parameter may involve economic benefit or return on investment.
2. **Schedule.** The schedule parameters shall include program initiation, major milestone decision points, initial operating capability, and any other critical system events. These specific other critical events shall be proposed by the PM and approved by the MDA for each program. In compliance with **10 USC 181⁵**, the JROC shall evaluate program schedule criteria, including critical schedule dates, for ACAT I programs (see 2.3).

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3. **Cost.** The cost parameters shall be limited to Research, Development, Test and Evaluation (RDT&E) costs; procurement costs; military construction costs; the costs of acquisition items procured with operations and maintenance funds, if applicable; total quantity (to include both fully configured development and production units); average unit procurement cost (defined as the total procurement cost divided by total procurement quantity); program acquisition unit cost (defined as the total of all acquisition related appropriations divided by the total quantity of fully configured end items); and any other cost objectives designated by the MDA, (e.g., life-cycle cost objective -- see 3.3.4); all in base year dollars. As the program progresses through later acquisition phases, procurement costs shall be refined based on contractor actual (or return) costs from program definition and risk reduction, engineering and manufacturing development, or from initial production lots. In all cases, the cost parameters shall reflect the total program and be realistic cost estimates, based on a careful assessment of risks and realistic appraisals of the level of costs most likely to be realized. The amount budgeted shall not exceed the total cost threshold estimated in the APB. For ACAT IA programs, the ACAT I cost parameters apply, with the addition of military pay and the costs of acquisition items procured with Defense Working Capital Funds (DWCF). In compliance with **10 USC 181⁶**, the JROC shall evaluate program cost criteria for ACAT I programs (see 2.3).

No funds shall be obligated for an ACAT I program after that program enters engineering and manufacturing development or production and deployment until an APB has been approved by the MDA, unless the **USD(AT&L)** has specifically approved the obligation, in accordance with **10 USC §2435(b)⁷**.

3.2.3 Exit Criteria

MDAs shall use exit criteria to establish goals for ACAT I (**10 USC §2220(a)(1)⁸**) and ACAT IA (**CCA⁹**) programs during an acquisition phase. At each milestone review, the PM shall propose exit criteria appropriate to the next phase of the program. The MDA shall approve the exit criteria. Exit criteria are normally selected to track progress in important technical, schedule, or management risk areas. The exit criteria shall serve as gates that, when successfully passed or exited, demonstrate that the program is on track to achieve its final program goals and should be allowed to continue with additional activities within an acquisition phase or be considered for continuation into the next acquisition phase. Exit criteria are not part of the APB and are not intended to repeat or usurp the minimum required accomplishments for each phase contained in the APB or this **Memorandum**. They do not cause program deviations. Exit criteria are some level of demonstrated performance outcome (e.g., level of engine thrust), the accomplishment of some process at some level of efficiency (e.g., manufacturing yield) or successful accomplishment of some event (e.g., first flight), or some other criterion (e.g., establishment of a training program or inclusion of a particular clause in the follow-on contract) that indicates that aspect of the program is progressing satisfactorily. Exit criteria are documented in the ADM. The Defense Acquisition Executive Summary (DAES) report shall be the mechanism for status reporting of exit criteria for ACAT I programs. The MAIS Quarterly Report shall be the mechanism for status reporting of exit criteria for ACAT IA programs.

3.3 Acquisition Strategy

Each PM shall develop and document an acquisition strategy that shall serve as the roadmap for program execution from program initiation through post-production support. A primary goal in developing an acquisition strategy shall be to minimize the time and cost of satisfying an identified, validated need, consistent with common sense and sound business practices. The acquisition strategy shall evolve through an iterative process and become increasingly more definitive in describing the relationship of the essential elements of a program. Essential elements in this context include, but are not limited to, open systems, sources, risk management, cost as an independent variable, contract approach, management approach, environmental considerations, modeling and simulation approach, warranty considerations, and source of support. The PM shall also address other major initiatives that are critical to the success of the program.

The acquisition strategy shall include the critical events that shall govern the management of the program. The event-driven acquisition strategy shall explicitly link program decisions to demonstrated accomplishments in development, testing, initial production, and life-cycle support. The events set forth in contracts shall support the appropriate exit criteria for the phase, or intermediate development events, established for the acquisition strategy.

The acquisition strategy shall be tailored to meet the specific needs of individual programs, including consideration of incremental (block) development and fielding strategies. The benefits and risks associated with reducing lead time through concurrency shall be specifically addressed in tailoring the acquisition strategy. In tailoring an acquisition strategy, the PM shall address the management requirements imposed on the contractor(s) (**CCA¹⁰**).

The PM shall initially develop the acquisition strategy at program initiation (usually Milestone **B**), and shall keep the strategy current by updating it whenever there is a change to the approved acquisition strategy or as the system approach and program elements are better defined. The PM shall develop the acquisition strategy in coordination with the Working-level Integrated Product Team. The PEO and CAE, as appropriate, shall concur in the acquisition strategy. The MDA shall approve the acquisition strategy prior to release of the formal solicitation. This approval shall usually precede the milestone review, except at program initiation when the strategy shall usually be approved as part of the initial milestone decision review.

3.3.1 Open Systems

PMs shall establish open systems objectives and document their approach specifying the level(s) of openness of system, subsystems, and/or components to be acquired, and devise an open systems strategy to achieve these objectives. An open systems strategy focuses on fielding superior warfighting capability more quickly and more affordably by using multiple suppliers and commercially supported practices, products, specifications, and standards, which are selected based on performance, cost, industry acceptance, long term availability and supportability, and upgrade potential.

3.3.2 Sources

In developing and updating the acquisition strategy, the PM shall consider all prospective sources of supplies and/or services that can meet the need, both domestic and foreign.

Commercial and non-developmental items shall be considered as the primary source of supply **(10 USC 2377; CCA¹¹)**. The PM, through the use of Integrated Product Teams (IPTs), shall include in the consideration the national policies on contracting and subcontracting with small business **(15 USC §644(a) & (j)¹²)**, small and disadvantaged business **(15 USC §637(d)(4)-(6)¹³)**, women-owned small business **(PL 100-533¹⁴)**, and labor surplus areas **(15 USC §644(d)¹⁵)**. Alternatives considered to secure participation of these entities as prime contractors in the initial or later phases of the life cycle shall be addressed. In addition, strategies to ensure participation at the subcontract levels shall be developed.

3.3.2.1 Commercial and Non-Developmental Items

Market research and analysis shall be conducted to determine the availability and suitability of existing commercial and non-developmental items prior to the commencement of a development effort, during the development effort, and prior to the preparation of any product description. The PM shall define requirements (including hardware, software, standards, data, and automatic test systems) in terms that enable and encourage offerors to supply commercial and non-developmental items and provide offerors of commercial and non-developmental items an opportunity to compete in any procurement to fill such requirements. The PM shall require prime contractors and subcontractors at all levels to incorporate commercial and non-developmental items as components of items supplied and shall modify requirements to the maximum extent practicable, to ensure that the requirements can be met by commercial and non-developmental items **(10 USC §2377¹⁶)**. For ACAT I and IA programs, while few commercial items meet requirements at a system level, numerous commercial components, processes, and practices have application to DoD systems. Commercial and non-developmental items selected shall be based on open standards and commercial item descriptions to the maximum extent practicable. If products with closed interfaces are to be acquired, risks and impacts on total cost of ownership shall be evaluated. Preference shall be given to the use of commercial items first and non-developmental items second. The overriding concern is to use the most cost-effective source of supply throughout a system's life-cycle.

A commercial item is defined as any item, other than real property, that is of a type customarily used for nongovernmental purposes and that: (1) has been sold, leased, or licensed to the general public; or, (2) has been offered for sale, lease, or license to the general public; or any item that evolved through advances in technology or performance and that is not yet available in the commercial marketplace, but will be available in the commercial marketplace in time to satisfy the delivery requirements under a Government solicitation. Also included in the definition are services in support of a commercial item, or a type offered and sold competitively in substantial quantities in the commercial marketplace based on established catalog or market prices for specific tasks performed under standard commercial terms and conditions; this does not include services that are sold based on hourly rates without an established catalog or market price for a specific service performed **(FAR 2.101¹⁷)**.

Open system-based commercial items are defined as commercial items that use open standards as their primary interface standards and are selected based on the criteria specified under the section called "Open Systems" (see 3.3.1).

A modified commercial item is any item with modifications of a type customarily available in the commercial marketplace or minor modifications of a type not customarily available in the commercial marketplace made to meet Federal Government requirements. Such modifications are considered minor if the change does not significantly alter the nongovernmental function or

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essential physical characteristics of an item or component, change the purpose of the process. Factors to be considered in determining whether a modification is minor include the value and size of the modification and the comparative value and size of the final product. Dollar values and percentages may be used as guideposts, but are not conclusive evidence that a modification is minor.

A non-developmental item is: (1) any previously developed item of supply used exclusively for governmental purposes by a Federal Agency, a State or local government, or a foreign government with which the United States has a mutual defense cooperation agreement; (2) any item described in (1) that requires only minor modification or modifications of a type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency; or (3) any item of supply being produced that does not meet the requirements described in (1) or (2) solely because the item is not yet in use (**FAR 2.101¹⁸**).

Open system-based non-developmental items are defined as non-developmental items that use open standards as their primary interface standards and are selected based on the criteria specified under the section called "Open Systems" (see 3.3.1).

Use of commercial or non-developmental items does not exempt the PM from complying with environmental requirements, unless exempted by statute.

3.3.2.2 Dual Use Technologies and Use of Commercial Plants

The PM shall develop an acquisition strategy that encourages offerors to employ dual use technologies or commercial plants and supplies for defense-unique items, to the maximum extent practicable. Dual use technologies are defined as technologies with both a military and a civil application. Market research and analysis shall be conducted to identify and evaluate possible dual use technologies and commercial suppliers throughout research and development. Contractors shall also be encouraged to integrate military production into commercial production to the maximum extent possible. Finally, system design shall facilitate the incorporation and insertion of leading edge dual use technologies and commercial suppliers through the system's life cycle.

3.3.2.3 Industrial Capability

The PM shall structure the acquisition strategy to promote sufficient program stability to encourage industry to invest, plan and bear risks. Program needs shall be met through reliance on a national technology and industrial base sustained primarily by commercial demand. Programs shall minimize the need for new defense-unique industrial capabilities. Foreign sources and international cooperative developments shall be used where advantageous and within limitations of the law (**DFARS Part 225¹⁹**).

The program acquisition strategy shall analyze the industrial capability to design, develop, produce, support and, if appropriate, restart the program (**10 USC §2440²⁰**). This analysis shall identify DoD investments needed to create new industrial capabilities, and the risks of industry being unable to provide program design or manufacturing capabilities at planned cost and schedule. If the analysis indicates there is an issue beyond the scope of the program, the PM shall raise it through the PEO to the MDA. Prior to production termination, Components shall take actions to ensure there will be adequate industrial capabilities and capacity to meet post-

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production operational needs. Actions shall address product technology obsolescence, replacement of life limited items, and regeneration options for unique manufacturing processes.

When there is an indication that industrial capabilities needed by DoD are in danger of being lost, Components shall perform an analysis to determine whether government action is required to preserve an industrial capability vital to national security.

3.3.2.4 Critical Product and Technology Competition

All acquisition programs shall foster competition at subcontractors levels, as well as at the prime level, particularly in critical product and technology areas. To accomplish this, the PM shall focus on critical product and technology competition when: a) formulating the acquisition strategy; b) exchanging information with industry; and c) managing the program system engineering and life cycle.

The acquisition strategy shall be based, in part, on an analysis of product and technology areas critical to meeting the program's needs. The acquisition strategy shall identify the potential industry sources available to supply these critical products and technologies. The acquisition strategy shall highlight areas of potential vertical integration, that is, areas where potential prime contractors are also potential suppliers for critical products and technologies. Vertical integration may be detrimental to the DoD's interests if a firm employs internal capabilities without consideration of, or in spite of the superiority of, the capabilities of outside sources. The acquisition strategy shall describe the approaches the PM will use (e.g., requiring an open systems architecture, investing in alternate technology or product solutions, breaking out a subsystem or component, etc.) to establish or maintain access to competitive suppliers for critical areas at the system, subsystem, and component levels.

During early exchanges of information with industry (e.g., the draft RFP process), PMs shall identify those critical product and technology areas that the primes plan to provide internally or through exclusive teaming, and assess possible competition effects of these choices. The PM shall take action to mitigate areas of risk. When those actions require a change to the approved acquisition strategy, the PM shall recommend the needed change to the MDA.

As the designs evolve, the PM shall continue to analyze how the prime contractor is addressing the program's critical product and technology areas (see 4.4.10). This analysis may identify areas where the design unnecessarily restricts subsystem or component choices. Contractors shall be challenged during requirements and design reviews to support why planned materiel solutions for subsystem and component requirements critical to the program are appropriate when other choices are available. This monitoring shall continue through the weapon system life cycle (e.g., procurements, logistics support).

3.3.2.5 Leasing

The PM shall consider the use of leasing in the acquisition of commercial vehicles and equipment whenever the PM determines that leasing of such vehicles is practicable and efficient. The PM shall not enter into any lease with a term of 18 months or more, or extend or renew any lease for a term of 18 months or more, for any vessel, aircraft, or vehicle, unless the PM has considered all costs of such a lease (including estimated termination liability) and has determined in writing that the lease is in the best interest of the Government. (10 USC §2401a²¹)

3.3.3 Cost, Schedule, and Performance Risk Management

The PM shall establish a risk management program for each acquisition program to identify and control performance, cost, and schedule risks. The risk management program shall identify and track risk drivers, define risk abatement plans, and provide for continuous risk assessment throughout each acquisition phase to determine how risks have changed. Risk reduction measures shall be included in cost-performance trade-offs, where applicable. The risk management program shall plan for back-ups in risk areas and identify design requirements where performance increase is small relative to cost, schedule, and performance risk. The acquisition strategy shall include identification of the risk areas of the program and a discussion of how the PM intends to manage those risks.

3.3.4 Cost as an Independent Variable (CAIV)

CAIV is a process that helps arrive at cost objectives (including life-cycle costs) and helps the requirements community set performance objectives. The CAIV process shall be used to develop an acquisition strategy for acquiring and operating affordable DoD systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Cost objectives shall also be set to balance mission needs with projected out-year resources, taking into account anticipated process improvements in both DoD and defense industries (**GPRA²²** and **CCA²³**).

3.3.4.1 Cost/Performance Trade-offs

The best time to reduce life-cycle costs is early in the acquisition process. Cost reductions shall be accomplished through cost/performance tradeoff analyses, which shall be conducted before an acquisition approach is finalized. To facilitate that process, the Overarching IPT (OIPT) for each ACAT I and ACAT IA (as required) program shall establish a Cost/Performance IPT (CPIPT). The user community shall have representation on the CPIPT. Industry representation, consistent with statute and at the appropriate time, shall also be considered. Normally, the PM or the PM's representative leads the CPIPT. Prior to each milestone decision, the PM shall report the CPIPT findings to the OIPT leader.

Upon approval of a MNS (see 2.3), a CAIV strategy shall be formulated as part of the acquisition strategy to set cost objectives. By program initiation (usually Milestone **B**), each ACAT I and ACAT IA PM shall have established life-cycle cost objectives for the program through consideration of projected out-year resources, recent unit costs, parametric estimates, mission effectiveness analysis and trades, accident attrition trade studies, technology trends, and other relevant considerations such as commercial versus DoD specifications (see 3.3.5.2) and the open systems strategy and design (see 3.3.1 and 4.3.4). A complete set of life-cycle cost objectives shall include RDT&E, production, MILCON, operating and support, and disposal costs. At each subsequent milestone review, cost objectives and progress towards achieving them shall be reassessed.

Maximizing the PM's and contractors' flexibility to make cost/performance tradeoffs without unnecessary higher-level permission is essential to achieving cost objectives. Therefore, the number of threshold items in requirements documents and acquisition program baselines shall be strictly limited, the threshold values shall represent true minimums, and requirements shall be stated in terms of capabilities, rather than technical solutions and specifications. RFPs shall include a strict minimum number of critical performance criteria that

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allow industry maximum flexibility to meet overall program objectives. Cost objectives shall be used as a management tool. The source selection criteria communicated to industry shall reflect the importance of developing a system that can achieve stated production and life-cycle cost objectives.

The CPIPT shall be empowered to recommend to the PM performance or engineering and design changes as long as the threshold values in the Operational Requirements Document (ORD) and APB can be achieved. If the changes require ORD/APB threshold value changes, the leader of the CPIPT shall notify the PM and the OIPT leader. The PM shall ensure that proposed changes are quickly brought before the ORD and/or APB approval authorities for decision. The PM shall have responsibility for the conduct and integration of all cost performance trade-off analyses conducted.

While the approach outlined here applies to ACAT I and ACAT IA programs, the same principles may be applied to other programs at the discretion of the CAE.

3.3.4.2 Cost Management Incentives

RFPs shall be structured to incentivize the contractor to meet or exceed cost objectives. Whenever applicable, risk reduction through use of mature processes shall be a significant factor in source selection. For industry, competition to win business, along with attendant business profit, is by far the most powerful incentive. Therefore, competition shall be maintained for as long as practicable in all acquisition programs.

Incentives shall be applied to both Government and industry to achieve the objectives of cost as an independent variable. Awards programs (both monetary and non-monetary) and “shared savings” programs shall be used creatively to encourage the generation of cost-saving ideas for all phases of life-cycle costs. Incentive programs shall target both individuals and teams in both government and industry. Incentives shall stress up-front investments to minimize production and/or operation and support costs, where applicable.

3.3.5 Contract Approach

The acquisition strategy shall discuss the types of contracts contemplated for each succeeding phase, including considerations of risk assessment, reasonable risk-sharing by Government and contractor(s), and the incentive structure for contractors to decrease cost (**CCA²⁴**). The strategy shall specify if options are to be used for future requirements. Fixed price development contracts of \$25 million or more or fixed price type contracts for lead ships shall not be used without the prior approval of the **USD(AT&L) (DFARS 235.006²⁵)**. Multiyear contracting shall be considered for full rate production and implemented when the requirements of **FAR 17.1²⁶** are satisfied. Multiyear contracting shall be done in accordance with **10 USC §2306b²⁷**.

To the maximum extent practicable, modular contracting, as described in **Section 5202 of Division E of the Clinger-Cohen Act²⁸**, shall be used for major information technology acquisitions. Program managers shall consider use of modular contracting for other acquisition programs.

3.3.5.1 Competition

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PMs and contracting officers shall provide for full and open competition, unless one of the limited statutory exceptions apply (**FAR 6.3²⁹**). PMs and contracting officers shall use competitive procedures best suited to the circumstances of the acquisition program. The acquisition strategy for all acquisition programs shall describe plans to attain program goals via competition in all increments and life-cycle phases. Competitive prototyping, competitive alternative sources, and competition with other systems that may be able to accomplish the mission shall be used where practicable.

The PM shall consider component breakout. An open systems design (see 4.3.4) facilitates component breakout. Existing systems not designed as open systems may restrict the use of component breakout. The acquisition strategy shall address component breakout plans and shall include rationale justifying the component breakout strategy (**DFARS Appendix D³⁰**). Component breakout shall be considered on every program and shall be done when there are significant cost savings (inclusive of Government administrative costs), when the technical or schedule risk of furnishing government items to the prime contractor is manageable, and when there are no other overriding Governmental interests (e.g., industrial capability considerations or dependence on contractor logistics support). Components considered for breakout shall be listed, and a brief rationale (based on supporting analyses from a detailed component breakout review (which shall not be provided to the MDA unless specifically requested)) for those major components where a decision was made not to breakout shall be provided. A decision not to break out any components shall also require justification.

The Head of each DoD Component with acquisition responsibilities shall designate a competition advocate for the Component and in each procurement activity as a resource to help the Component Head to achieve a competitive environment and promote the acquisition of commercial items (**41 USC §418³¹** and **10 USC §2318³²**). The DoD Competition Advocate and the Competition Advocates in the Military Departments shall be at the general/flag officer rank or the senior executive service level (**10 USC §2318³³**). The advocate for competition for each procuring activity shall be responsible for promoting full and open competition, promoting the acquisition of commercial items, and challenging barriers to such acquisition, including such barriers as unnecessarily restrictive statements of need, unnecessarily detailed specifications, and unnecessarily burdensome contract clauses.

3.3.5.2 Best Practices

PMs shall avoid imposing government-unique requirements that significantly increase industry compliance costs. Examples of practices designed to accomplish this direction include: IPPD performance-based specifications, management goals, reporting and incentives; open systems approach that emphasizes commercially supported practices, products, specifications, and standards; replacement of government-unique management and manufacturing systems with common, facility-wide systems; realistic cost estimates and cost objectives, adequate competition among viable offerors; best value evaluation and award criteria; use of past performance in source selection, results of software capability evaluations; government-industry partnerships; and the use of pilot programs to explore innovative practices. The use of best practices shall be addressed at each milestone review.

3.3.5.3 Cost Performance

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The purpose of earned value management systems (EVMS) criteria is to provide the contractor and the Government PMs with accurate data to monitor execution of their program and to:

1. Preclude the imposition of specific cost and schedule management control systems by providing uniform evaluation criteria to ensure contractor cost and schedule management control systems are adequate.
2. Provide an adequate basis for responsible decision making by both contractor management and DoD Component personnel by requiring that contractors' internal management control systems produce data that: (a) indicate work progress; (b) properly relate cost, schedule, and technical accomplishment; (c) are valid, timely, and able to be audited; and (d) provide DoD Component managers with information at a practical level of summarization.
3. Bring to the attention of DoD contractors, and encourage them to accept and install management control systems and procedures that are most effective in meeting requirements and controlling contract performance.
4. Provide a baseline requirement against which industry, national, and international standards may be evaluated for authorization by the ***USD(AT&L)*** as substitutes for EVMS criteria.

When applicable, the contract shall require that any system used by the contractor in planning and controlling the performance of the contract shall meet the criteria set forth in Appendix VI. Nothing in these criteria is intended to affect the basis on which costs are reimbursed and progress payments made, and nothing herein shall be construed as requiring the use of any single system, or specific method of management control of evaluation of performance. The government shall not require the contractor's internal systems to be changed provided they satisfy these criteria.

Unless waived by the MDA or a designated representative, compliance with the EVMS criteria shall be required on significant contracts and subcontracts within all acquisition programs, including highly sensitive classified programs and major construction programs. This also includes significant contracts executed for foreign governments and for specialized organizations such as the Defense Advanced Research Projects Agency, and significant acquisition effort performed by Government activities. Significant contracts include research, development, test, and evaluation contracts and subcontracts with a value of \$70 million or more or procurement contracts and subcontracts with a value of \$300 million or more (in FY 1996 constant dollars). Compliance with the EVMS criteria on contracts and subcontracts below these thresholds may be required when, in the DoD Component manager's judgment, the contract risk or management interest requires assurance that the contractor's cost and schedule management control systems are acceptable. On contracts that are determined to be not significant enough for EVMS criteria applicability, the cost/schedule status report (C/SSR) (see 6.4.3) shall be required unless excluded in accordance with the following paragraph.

Compliance with the EVMS criteria shall not be required on firm fixed price contracts (including firm fixed price contracts with economic price adjustment provisions), time and materials contracts, and contracts which consist mostly of level-of-effort work. Exceptions may be made by the MDA for individual contracts.

3.3.5.3.1 Integrated Baseline Reviews

For contracts requiring compliance with DoD EVMS criteria (see 3.3.5.3) or Cost/Schedule Status Report (C/SSR) requirements (see 6.4.3), program managers and their technical staffs or Integrated Product Teams (IPTs) shall review contractor planning baselines within six months after contract award. The program manager's review of a contractor's performance measurement baseline is known as an Integrated Baseline Review (IBR). The objectives of the IBR are as follows:

1. Ensure reliable plans and performance measurement baselines are established which (a) capture the entire scope of work, (b) are consistent with contract schedule requirements, and (c) have adequate resources assigned to complete program tasks;
2. Improve the use of cost/performance data by Government and contractor program managers as a management tool; and
3. Reduce the number of EVMS criteria management systems reviews based on insights developed through assessment of the contractor's actual implementation of their management system and processes on the instant contract. (Note, however, that IBRs are not management systems reviews. Significant management systems concerns observed during an IBR shall be referred to the cognizant surveillance activity for appropriate action.)

It should be noted that the purpose of an IBR is to achieve a mutual understanding of the plan and its relationship to the underlying management control systems and processes that will operate during contract execution. Consequently, while an IBR may surface disagreements, the contractor cannot fail an IBR.

3.3.5.4 Advance Procurement*

In accordance with **DoD 7000.14-R³⁴**, procurement of end items shall be fully funded, i.e., the cost of the end items to be bought in any fiscal year shall be completely included in that year's budget request. However, there are occasions when it is appropriate that some components, parts, material, or effort be procured in advance of the end item buy to preclude serious and costly fluctuation in program continuity. In these instances, the long lead-time material or effort may be procured with advance procurement funds but only in sufficient quantity to support the next fiscal year quantity end-item buy (except for economic order quantity (EOQ) procurement of material to support a multi-year procurement and only to buy those long-lead items necessary to maintain critical skills and proficiencies that would otherwise have to be reconstituted at significantly greater net cost to the Government. Because such use of advance procurement limits the MDA's flexibility, this acquisition technique shall be used only when the cost benefits are significant and only with approval of the MDA.

Exit criteria for awarding of the initial long lead-time items contract and/or for awarding of individual follow-on long lead-time lots shall be established as an integral part of the milestone approval process. These approved exit criteria shall be satisfied before any advance

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procurement funding may be released. The initiation of advance procurement in support of long lead material shall use a separate contract.

*Not applicable to ACAT IA programs.

3.3.5.5 Continuous Acquisition and Life-Cycle Support (CALs) --Acquisition Program Integrated Digital Environment (IDE)

Beginning in FY97, all new contracts shall require on-line access to, or delivery of, their programmatic and technical data in digital form, unless analysis shows that life-cycle time or life-cycle costs would be increased by doing so. Preference shall be given to on-line access to contractor developed data through contractor information services or existing information technology infrastructure rather than data delivery. The PM shall be responsible for establishing a data management system and appropriate IDE that meets the data requirements of the program throughout its total life-cycle. MDAs shall assess the IDE developed to enhance the program and mitigate long-term costs at each milestone and program review.

In the implementation of an IDE, independent standards setting bodies' data formats shall take precedence over all other formats. The issue of data formats and transaction sets shall be independent of the method of access or delivery.

Acquisition strategies and plans shall describe the extent of implementation of these requirements in accordance with **DFARS 207.105³⁵**. Solicitations shall require specific proposals for an IDE to support systems engineering and logistics activities. The PM shall ensure compatibility of data deliverables with existing internal information systems, and augment such systems as required to provide timely data access and distribution consistent with **DFARS 227³⁶ and 252³⁷**.

This ***Memorandum*** hereby authorizes the publication of **DoD** 5010.12-M, DoD Technical Data Management Program, and **DoD** 5010.12-L, Acquisition Management Systems Data Requirements Control List (AMSDL), which list the data item descriptions and source documents approved for use in acquisition.

Programs electing not to use the data management processes described in **DoD** 5010.12-M must find other ways to comply with Public Law 104-13, The Paperwork Reduction Act of 1995 (**PRA³⁸**).

3.3.6 Management Approach

The acquisition strategy shall be developed in sufficient detail to establish the managerial approach that shall be used to achieve program goals.

3.3.6.1 Streamlining

The PM shall streamline all acquisitions so that the acquisitions contain only those requirements that are essential and cost-effective. Contract requirements shall be stated in terms of performance rather than design-specific procedures. Management data requirements shall be limited to those essential for effective control. Acquisition process requirements shall be tailored to meet the specific needs of individual programs. Relief or exemption shall be sought for those requirements that fail to add value, are not essential, or are not cost-effective. Early

industry involvement in the acquisition effort, consistent with the Federal Advisory Committee Act (**FACA**³⁹), shall be encouraged to take advantage of industry expertise to improve the acquisition strategy.

3.3.6.2 International Considerations*

The acquisition strategy shall discuss the potential for enhancing reciprocal defense trade and cooperation, including international cooperative research, development, production, logistic support, and the sale of military equipment, consistent with the maintenance of a strong national technology and industrial base, and mobilization capability. This discussion shall meet the requirements specified for the cooperative opportunities reported directed by **10 USC §2350a(g)**⁴⁰. If foreign competition is restricted for industrial base reasons, **USD(AT&L)** prior approval is required. Prior to entering into a cooperative agreement, the program shall be reviewed by the MDA and be approved as an international program.

The **USD(AT&L)** shall approve any foreign military sale, commitment to sell, or DoD agreement for licensing the export of any ACAT I or II system that has not successfully completed the Operational Test and Evaluation (OT&E) required prior to approval for full rate U.S. production. This policy is not intended to interfere with any legitimate government-sponsored discussions of potential cooperative opportunities for both development and production programs involving key allies, provided only that such discussion include a clear and unambiguous articulation of this policy. This policy is also not intended to interfere with any reasonable advance business planning and marketing discussions with potential foreign customers by defense contractors, provided that authorizing licenses for these discussions include a requirement that the contractor notify in writing potential customers of this policy.

*Normally not applicable to ACAT IA programs.

3.3.6.3 Joint Program Management

Any acquisition system, subsystem, component, or technology program that involves a strategy that includes funding by more than one DoD Component during any phase of a system's life cycle shall be defined as a joint program. Joint programs shall be consolidated and collocated at the location of the lead Component's program office, to the maximum extent practicable. This includes systems where one DoD Component may be acting as acquisition agent for another DoD Component by mutual agreement or where statute, DoD Directive, or the **USD(AT&L)** or ASD(C3I) has designated a DoD organization to act as the lead (e.g., USSOCOM, BMDO, DARO). In the case of a designated organization given acquisition responsibilities, the CAE of that organization shall utilize the acquisition and test organizations and facilities of the Military Departments to the maximum extent practicable, rather than create new, unique organizations and facilities. The relationship between the designated organization and the Military Departments and Defense Agencies, and their respective responsibilities, shall be specified in a Memorandum of Agreement (MOA). The MOA shall address, at a minimum, the following topics: system requirements, funding, manpower, and the approval process for the ORD and other program documentation. Mission needs, operational requirements, and program strategies shall be structured to encourage and to provide an opportunity for multi-Component participation. The DoD Components shall periodically review their programs and requirements to determine the potential for cooperation.

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The JROC, or Principal Staff Assistant (PSA) for ACAT IA programs, shall review and validate ACAT I or ACAT IA Component MNS and ORDs, as appropriate, and shall recommend establishment of joint programs based on their joint potential. DoD Component Heads shall also recommend establishment of joint programs. The decision to establish a joint program shall be made by the MDA, who shall designate the lead Component as early in the acquisition process as possible.

The designated lead DoD Component Head shall select a single qualified program manager for the designated joint program. The selected joint program manager is fully responsible and accountable for the cost, schedule, and performance of the system development. In cases where the joint program is a consolidation of several programs with multiple Component program managers, the joint program manager retains responsibility for overall system development and integration.

A designated joint program shall have one quality assurance program, one program change control program, one integrated test program, and one set of documentation and reports to include one joint program ORD, one Test and Evaluation Master Plan (TEMP), one APB, one DAES, one Quarterly Report for ACAT IA programs, and one Selected Acquisition Report (SAR) for ACAT I programs. The documentation for milestone reviews and periodic reports shall flow only through the lead DoD Component acquisition chain, and shall be supported by the participating DoD Components. Unless otherwise directed by the MDA or agreed to through an Memorandum of Agreement (MOA) signed by all Components, the lead DoD Component shall budget for and manage the common RDT&E funds for assigned joint programs. Individual DoD Components shall budget for their unique requirements. Inter-Component logistics support shall be utilized to the maximum extent practicable, consistent with effective support to the operational forces and efficient use of DoD resources.

A lead organization shall be designated to coordinate all operational test and evaluation involving more than one DoD Component. A single report on operational effectiveness and suitability shall be produced.

DoD Components may not terminate or substantially reduce participation in joint ACAT ID programs without the approval of the ***USD(AT&L)***. Before any such termination or substantial reduction is approved, the proposed termination or substantial reduction shall be reviewed by the JROC. The ***USD(AT&L)*** may require a Component to continue to provide some or all of the funding necessary to allow the joint program to continue in an efficient manner after approval of a Component request to terminate or substantially reduce that Component's participation (**10 USC §2311(c)⁴¹**). Substantial reduction is defined as a funding or quantity decrease of 50% or more in the total funding or quantities in the latest President's Budget for that portion of the joint program funded by the Component seeking to reduce its participation.

3.3.6.4 Assignment of Program Executive Responsibility

Unless a waiver is granted for a particular program by the ***USD(AT&L)*** or the ASD(C3I), CAEs shall assign acquisition program responsibilities to a PEO for all ACAT I, ACAT IA, and sensitive classified programs, or for any other program determined by the CAE to require dedicated executive management. The CAE shall make this assignment no later than three months after program initiation; or within three months of total program cost reaching the appropriate dollar threshold for ACAT I and ACAT IA programs. CAEs may determine that a specific PM shall report directly, without being assigned to a PEO, whenever such direct

reporting is appropriate. The CAE shall notify the ***USD(AT&L)*** or the ASD(C3I) of the decision to have a PM report directly to the CAE. Acquisition program responsibilities for programs not assigned to a PEO or a direct reporting PM shall be assigned to a commander of a systems, logistics, or materiel command. In order to transition from a PEO to a commander of a systems, logistics, or materiel command, a program shall, at a minimum, have passed Initial Operating Capability (IOC), have achieved full-rate production, and be logistically supportable as planned.

3.3.6.5 Technical Representatives at Contractor Facilities

PMs shall make maximum use of Defense Contract Management Command (DCMC) personnel at contractor facilities. PMs and DCMC Contract Administration Offices shall jointly develop and approve program support plans for all ACAT I program contracts to ensure agreement on contract oversight needs and perspectives. Assignment of PM technical representatives in a contractor's facility shall occur only as necessary, shall be based on the mutual agreement of the respective PM and the Commander, DCMC, and shall be reflected in a Memorandum of Agreement that specifies the duties to be performed by the technical representative. In these cases, technical representatives shall not perform contract administration duties as outlined in **FAR 42.302(a)**⁴².

3.3.6.6 Information Sharing and DoD Oversight

DoD oversight activities (i.e., contract administration offices, contracting offices, technical activities, and program management offices) shall consider all relevant and credible information that might mitigate risks and the need for DoD oversight before designing and applying direct DoD oversight of contractor operations. DoD buying and technical activities shall provide to the Commander, DCMC copies of reviews of contractor operations and other documents assessing or rating contractor performance or operations. The Commander, DCMC shall make information relating to audits, reviews, or ratings of contractor operations, systems, or performance accessible to DoD buying and technical activities.

3.3.7 Environmental, Safety, and Health Considerations

The acquisition strategy shall include a programmatic environmental, safety, and health (ESH) evaluation. The PM shall initiate the ESH evaluation at the earliest possible time in support of a program initiation decision (usually Milestone ***B***) and shall maintain an updated evaluation throughout the life-cycle of the program. The ESH evaluation describes the PM's strategy for meeting ESH requirements (see 4.3.7), establishes responsibilities, and identifies how progress will be tracked.

3.3.8 Modeling and Simulation (M&S) Approach

Modeling and simulation shall be applied, as appropriate, throughout the system life-cycle in support of acquisition activities such as requirements definition, program management, design and engineering, efficient test planning, and results prediction; and to supplement actual test and evaluation, manufacturing, and logistics support. In collaboration with Industry, PMs shall integrate the use of modeling and simulation within program planning activities; plan for life-cycle application, support, and reuse of models and simulations; and integrate modeling and simulation across the functional disciplines.

3.3.9 Source of Support

It is DoD policy to maintain adequate organic core depot maintenance capabilities to provide effective and timely response to surge demands, ensure competitive capabilities, and sustain institutional expertise. Support concepts for new and modified systems shall maximize the use of contractor provided, long-term, total life-cycle logistics support that combines depot-level maintenance for non-core-related workload along with wholesale and selected retail materiel management functions. Best value over the life cycle of the weapon system and use of existing contractor capabilities, particularly while the system is in production, shall be key determinants in the overall decision process. The PM shall provide for long-term access to data required for competitive sourcing of systems support throughout its life cycle.

3.3.10 Warranties

The PM shall examine the value of warranties on major systems and pursue such warranties when appropriate and cost-effective. When appropriate, the PM shall incorporate warranty requirements into major systems contracts in accordance with FAR 46.7. (NOTE: Section 847 of the FY98 Defense Authorization Act repealed the 10 USC 2403 requirement for weapon system warranties.)

3.3.11 Government Property in the Possession of Contractors (GPPC)

All PMs who own or use GPPC shall have a process to ensure continued management emphasis on reducing GPPC and prevent any unnecessary additions of GPPC. PMs shall examine their management of active and idle GPPC and special tooling or special test equipment that the Government may require the contractor to deliver, to ensure that decisions about retention, disposition, and requiring delivery are informed and timely. The PM shall assign responsibility within the program office and detail actions, reviews, and reports to be used to manage and dispose of the GPPC used on the program. This also includes government property that is not “owned” by the PM, but is allowed to be used on the program. These planned actions shall be addressed in the acquisition strategy.

Government property may be furnished to contractors only under the criteria, restriction, and documentation requirements addressed in FAR 45.201.

The PM shall conduct a periodic review and maintain continued oversight of GPPC to assure that property no longer needed for contract performance is disposed of promptly. Property that has been declared excess by a contractor may be retained only if there is a known future need for the property. The PM shall insure that such property is stored by the contractor under a funded storage agreement. Individual decisions regarding particular property shall be documented in the contract file.

3.4 Test and Evaluation

Test and evaluation programs shall be structured to integrate all developmental test and evaluation (DT&E), operational test and evaluation (OT&E), live-fire test and evaluation (LFT&E), and modeling and simulation activities conducted by different agencies as an efficient continuum. All such activities shall be part of a strategy to provide information regarding risk and risk mitigation, to provide empirical data to validate models and simulations, to permit an assessment of the attainment of technical performance specifications and system maturity, and

to determine whether systems are operationally effective, suitable, and survivable for intended use.

Test and evaluation objectives for each phase of an ACAT I and ACAT IA program shall be designed to allow assessment of system performance appropriate to each phase and milestone. For ACAT I and II programs for conventional weapons systems designed for use in combat, a beyond low-rate initial production decision shall be supported by completed independent initial operational test and evaluation as required by **10 USC §2399⁴³** and by completed live fire test and evaluation as required by **10 USC §2366⁴⁴**. Operational test and evaluation does not include an operational assessment based exclusively on computer modeling, simulation, or an analysis of system requirements, engineering proposals, design specification, or any other information contained in program documents (**10 USC §2399⁴⁵**).

The Service or Agency shall provide weapon effectiveness data to Director, Test, Systems Engineering, and Evaluation for use in the Joint Munitions Effectiveness Manual for weapons in the acquisition process prior to their achieving IOC. These data shall be prepared using methodology coordinated with the Joint Technical Coordinating Group for Munitions Effectiveness.

3.4.1 Test and Evaluation Strategy

Test and evaluation planning shall begin in ***pre-systems acquisition, during Concept and Technology Development***. Both developmental and operational testers shall be involved early to ensure that the test program for the most promising alternative can support the acquisition strategy and to ensure the harmonization of objectives, thresholds, and measures of effectiveness (MOEs) in the ORD and TEMP. Test and evaluation planning shall address MOEs and measures of performance (MOPs) with appropriate quantitative criteria, test event or scenario description, resource requirements (e.g., special instrumentation, test articles, validated threat targets, validated threat simulators and validated threat simulations, actual threat systems or surrogates, and personnel), and identify test limitations.

1. Test planning, at a minimum, shall address all system components (hardware, software and human interfaces) that are critical to the achievement and demonstration of contract technical performance specifications and operational effectiveness and suitability requirements from the ORD.
2. Quantitative criteria shall be phased so as to provide substantive evidence for analysis of hardware, software and system maturity and readiness to proceed through the acquisition process. Linkage shall exist among the various MOEs and MOPs used in the analysis of alternatives or ORD, and test and evaluation; in particular, the MOEs, MOPs, and criteria in the ORD, the analysis of alternatives, the TEMP and the APB shall be consistent.
3. Test and evaluation planning must provide for completion of Initial Operational Test and Evaluation (IOT&E) and Live Fire Test and Evaluation (LFT&E), as required, before entering full-rate production.
4. Sufficient testing must be conducted on commercial and non-developmental items to ensure performance, operational effectiveness, and operational suitability for the military application. Test planning for these items shall include consideration of

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operational testing and LFT&E needed to assure effective performance in the intended operational environment. However, the test program shall be tailored to recognize commercial testing and experience.

5. Testing shall be planned and conducted to take full advantage of existing investment in DoD ranges, facilities, and other resources, wherever practical, unless otherwise justified in the TEMP. **DoDD 3200.11⁴⁶** identifies the major ranges and test facilities. In addition, the potential environmental impacts associated with testing must be considered (**42 USC §4321-4347⁴⁷** and **EO 12114⁴⁸**).
6. Early testing of prototypes in System Development and Demonstration, and early operational assessments shall be emphasized to assist in identifying risks.
7. Modeling and simulation shall be an integral part of test and evaluation planning.

A combined developmental test and operational test (DT/OT) approach is encouraged to achieve time and cost savings. The combined approach shall not compromise either developmental or operational test objectives. A final independent phase of operational test and evaluation shall be required for beyond low-rate initial production (LRIP) decisions.

The Director, Operational Test and Evaluation (D, OT&E) and the Director, Test, Systems Engineering and Evaluation (DTSE&E) shall be granted full and timely access to all available developmental, operational and live fire test and evaluation information.

All C4I systems having joint interoperability requirements, regardless of ACAT, must be tested and certified by the Joint Interoperability Test Command (JITC). This testing may be performed in conjunction with other testing (i.e., DT&E, OT&E, early user tests, etc.) whenever possible to conserve resources. The Director, DISA, through the use of the Joint Interoperability Test Command (JITC) shall certify to the developmental and operational testing organizations and to the Chairman of the Joint Chiefs of Staff that C4I systems and equipment meet the applicable requirements for compatibility, interoperability, and integration based on JITC certification testing, and other pertinent T&E results.

3.4.2 Developmental Test and Evaluation

Developmental test and evaluation (DT&E) programs shall:

1. Identify potential operational and technological capabilities and limitations of the alternative concepts and design options being pursued;
2. Support the identification of cost-performance trade-offs by providing analyses of the capabilities and limitations of alternatives;
3. Support the identification and description of design technical risks;
4. Assess progress toward meeting Critical Operational Issues, mitigation of acquisition technical risk, achievement of manufacturing process requirements and system maturity;
5. Assess validity of assumptions and conclusions from the analysis of alternatives;

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6. Provide data and analysis in support of the decision to certify the system ready for operational test and evaluation; and,
7. In the case of automated information systems, support an information systems security certification prior to processing classified or sensitive data and ensure a standards conformance certification.

The USD(AT&L) shall: (1) assess compliance with the systems engineering practices and developmental test and evaluation policies and procedures of this ***Memorandum***, and (2) ensure that threat target and simulator acquisitions meet developmental and operational test and evaluation requirements, and perform independent oversight of Component validation processes.

3.4.3 Certification of Readiness for Operational Test and Evaluation.

The developing agency shall prepare a DT&E Report, and formally certify that the system is ready for the next dedicated phase of operational test and evaluation to be conducted by the DoD Component operational test activity. The developing agency shall establish maturity criteria and performance exit criteria necessary for certification for operational test. In support of this, risk management measures and indicators, with associated thresholds, which address performance and technical adequacy of both hardware and software shall be defined and used on each program. A mission impact analysis of criteria and thresholds that have not been met shall be completed prior to certification for operational tests.

3.4.4 Modeling and Simulation

Modeling and simulation shall be integral to the test and evaluation program. The Simulation, Test and Evaluation Process (STEP) is used as a means to increase the focus in the TEMP on developing and documenting a robust and comprehensive evaluation strategy, using both simulation and test resources. In order for this process to be fully realized, the program office shall work with the T&E community in developing this evaluation strategy. The program shall identify and fund STEP resources early, while considering credibility and cost, in order to best allocate assets to the most appropriate issues.

3.4.5 Operational Test and Evaluation

Operational test and evaluation (OT&E) programs shall be structured to determine the operational effectiveness and suitability of a system under realistic conditions (e.g., combat) and to determine if the minimum acceptable operational performance requirements as specified in the ORD have been satisfied. The following procedures are mandatory:

1. Threat or threat representative forces, targets, and threat countermeasures, validated in coordination with DIA, shall be used.*
2. Typical users shall operate and maintain the system or item under conditions simulating combat stress and peacetime conditions.
3. The independent operational test activities shall use production or production representative articles for the dedicated phase of OT&E that supports the full-rate

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production decision, or for ACAT IA or other acquisition programs, the deployment decision.

4. The use of modeling and simulation shall be considered during test planning. Whenever possible, an operational assessment shall draw upon test results with the actual system, or subsystem, or key components thereof, or with operationally meaningful surrogates. When actual testing is not possible to support an operational assessment, such assessments may rely upon computer modeling, simulations (preferably with real operators in the loop), or an analysis of information contained in key program documents. However, as a condition for proceeding beyond LRIP, initial operational test and evaluation shall not comprise an operational assessment based exclusively on computer modeling; simulation; or, an analysis of system requirements, engineering proposals, design specifications, or any other information contained in program documents (**10 USC §2399⁴⁹**). The extent of modeling and simulation usage in conjunction with operational and test evaluation shall be explained in the Test and Evaluation Master Plan (see 3.4.11).
5. All hardware and software alterations that materially change system performance (operational effectiveness and suitability) shall be adequately tested and evaluated. This includes system upgrades as well as changes made to correct deficiencies identified during test and evaluation.
6. Naval vessels, the major systems integral to ship construction, and military satellite programs typically have development and construction phases that extend over long periods of time and involve small procurement quantities. To facilitate evaluations and assessments of system performance (operational effectiveness and suitability), the independent operational test activity shall monitor or participate in all relevant testing and use these results to make operational assessments.
7. Conduct an OT&E before full-rate production to evaluate operational effectiveness and suitability as required by **10 USC §2399⁵⁰** for ACAT I and II programs.
8. Operational Test Agencies shall participate early in program development to provide operational insights to the program office and to acquisition decisionmakers.
9. Operational testing and evaluation shall be structured to take maximum advantage of training and exercise activities to increase the realism and scope of operational testing and to reduce testing costs.

The Director, Operational Test and Evaluation shall: (1), assess the adequacy of OT&E and LFT&E conducted in support of acquisition program decisions, and (2) evaluate the operational effectiveness, operational suitability and survivability, as applicable, of systems under OT&E oversight.

*Normally not applicable to ACAT IA programs.

3.4.6 Operational Test and Evaluation Plans

The D, OT&E shall approve, in writing, the adequacy of the OT&E plans (including project funding) for all ACAT I programs, selected ACAT IAM programs, and other designated

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programs prior to the initiation of operational testing. Plans for all operational assessments of programs on D, OT&E's oversight list being conducted to support acquisition decisions such as LRIP or release of funds for long lead shall be approved by D, OT&E prior to their execution.

For oversight programs, continued D, OT&E test plan approval, monitoring, and reporting of FOT&E is required for the following purposes:

1. To complete IOT&E activity,
2. To refine estimates made during IOT&E,
3. To verify correction of deficiencies,
4. To evaluate significant changes to system design or employment, and
5. To evaluate whether the system continues to meet operational needs and retains effectiveness in a substantially new environment.

These are not open-ended conditions. When appropriate test reports are completed and D, OT&E analysis verifies that the items or components tested are effective and suitable for combat or that other open items are resolved, D, OT&E will notify concerned organizations that further operational testing is no longer required.

DoD Components shall brief the D, OT&E on the concepts for the test and evaluation or assessment 120 days prior to commencement and submit the test plan to the D, OT&E 60 days prior to commencement. Any major revisions to the operational test shall be reported to the D, OT&E. Testing shall not proceed in accordance with the major revision until approved by the D, OT&E.

These test plans shall include test objectives, measures of effectiveness, planned operational scenarios, threat simulation, resources, test limitations, and methods of data gathering, reduction, and analysis. The planned test events shall be described in sufficient detail to permit an assessment of operational realism.

3.4.7 Use of System Contractors in Support of Operational Test and Evaluation

The use of system contractors in support of the OT&E conducted to support a decision to proceed beyond low-rate initial production is restricted by **10 USC §2399⁵¹**. In ACAT I and II programs, contractors may participate only to the extent that is planned for them to be involved in the operation, maintenance, and other support of the system being tested when it is deployed in combat.

A contractor that has participated (or is participating) in the development, production, or testing of a system for a DoD Component (or for another contractor of the DoD) may not be involved in any way in the establishment of criteria for data collection, performance assessment, or evaluation activities for the operational test and evaluation. These limitations do not apply to a contractor that has participated in such development production or testing solely in testing for the federal government.

3.4.8 Production Qualification Test and Evaluation*

Production qualification test and evaluation shall be completed prior to the full rate production decision.

*Not applicable to ACAT IA programs.

3.4.9. Live Fire Test and Evaluation*

Live Fire Test and Evaluation (LFT&E), as that term is defined in **10 USC §2366⁵²** must be conducted on a covered system, major munition program, missile program, or product improvement to a covered system, major munition program, or missile program before it can proceed beyond low-rate initial production. A covered system is any vehicle, weapon platform, or conventional weapon system that includes features designed to provide some degree of protection to users in combat and that is an ACAT I or II program. Depending upon its intended use, a commercial or non-developmental item may be a covered system, or a part of a covered system.

Survivability testing shall begin at the component, subsystem, and subassembly level, culminating with tests of the complete covered system or program, or covered product improvement, configured for combat. A covered system, major munitions, a missile program, or a product improvement to a covered system, major munitions, or missile program may not proceed beyond low-rate initial production until realistic survivability or lethality testing is completed and the report required by statute is submitted to the prescribed congressional committees (**10 USC §2366⁵³**). Such testing shall be conducted sufficiently early in the development phase of the system or program (including a covered product improvement program) to allow any design deficiency demonstrated by the testing to be corrected in the design of the system, program, or product improvement before proceeding beyond low-rate initial production. For Commercial and Non-Developmental Items that are covered systems, the Under Secretary of Defense (Acquisition & Technology) shall identify equivalent events for the items that will allow the requirements of statute and this ***Memorandum*** to be met.

As delegated by the Secretary of Defense, the ***USD(AT&L)***, for ACAT ID programs, or the CAE, for less than ACAT ID programs, may waive the requirement for realistic survivability (i.e., full-up, system-level tests) and lethality tests if the ***USD(AT&L)*** or the CAE, before the system or program enters System Development and Demonstration, certifies to Congress that live fire testing of such system or program would be unreasonably expensive and impractical. Alternatively, in the case of a covered system (or covered product improvement program for a covered system), the ***USD(AT&L)*** or the CAE may waive the application of the required survivability and lethality tests and instead allow testing of a system or program by firing munitions likely to be encountered in combat at components, subsystems, and subassemblies, together with performing design analyses, modeling and simulation, and analysis of combat data in lieu of testing the complete system configured for combat. The strategy for such alternative testing shall be included within the waiver request, jointly reviewed by D, OT&E and DTSE&E, and approved by D, OT&E. Such alternative testing may not be carried out unless the ***USD(AT&L)*** or the CAE certifies to Congress, before the system or program enters engineering and manufacturing development, that the survivability and lethality testing of such system or program otherwise required would be unreasonably expensive and impracticable.

In either case, the ***USD(AT&L)*** or the CAE shall include, with any such certification, the D, OT&E-approved alternative strategy explaining how the ***USD(AT&L)*** or the CAE plans to evaluate the survivability or lethality of the system or program and assessing possible alternatives to realistic survivability and lethality testing of the system or program. Waiver of the requirement for realistic survivability testing does not remove the requirement for survivability testing of components, subsystems, and subassemblies.

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Waivers and the use of alternative survivability and lethality testing shall be addressed in the TEMP for the covered system, program, or covered product improvement program. CAE certifications and reports required under **10 USC §2366(c)** shall be submitted to Congress through the ***D, OT&E and the USD(AT&L)***. Further LFT&E procedures are contained in Appendix IV.

*Not applicable to ACAT IA programs.

3.4.10 Foreign Comparative Testing (FCT)

FCT is a DoD test and evaluation program that is prescribed by **10 USC §2350a(g)**⁵⁴ and that is centrally managed by the USD(AT&L). FCT provides funding for U.S. test and evaluation of selected equipment items and technologies developed by allied countries when such items and technologies are identified as having good potential to satisfy valid DoD requirements.

3.4.11 Test and Evaluation Master Plan

The Test and Evaluation Master Plan (TEMP) shall focus on the overall structure, major elements, and objectives of the test and evaluation program that is consistent with the acquisition strategy. It shall include sufficient detail to ensure the timely availability of both existing and planned test resources required to support the test and evaluation program.

A TEMP shall:

1. be prepared for all ACAT I and ACAT IA programs and other acquisition programs designated for D, OT&E or Office of the Secretary of Defense test and evaluation oversight (**10 USC §2399**⁵⁵);
2. be approved by the D, OT&E and the USD(AT&L) for all ACAT I programs, selected ACAT IAM programs, and other designated programs; and,
3. provide a road map for integrated simulation, test, and evaluation plans, schedules, and resource requirements necessary to accomplish the test and evaluation program.

The TEMP format and procedures are provided in Appendix III. This format may be used at the discretion of the MDA for other ACAT II and III programs and highly sensitive classified programs.

3.5 Life-Cycle Resource Estimates

For all ACAT I and IA programs, a life-cycle cost estimate shall be prepared by the program office in support of program initiation (usually Milestone **B**) and all subsequent milestone reviews. For ACAT I programs, a manpower estimate shall be prepared by the Component's manpower authority in support of Milestone **B**. For ACAT I programs, the MDA may not approve entry into engineering and manufacturing development or production and deployment unless an independent estimate of the full life-cycle cost of the program and a

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manpower estimate for the program have been completed and considered by the MDA (**10 USC §2434⁵⁶**).

For ACAT IA programs, the estimate shall include life-cycle benefits in addition to life-cycle costs (**CCA⁵⁷** and **PRA⁵⁸**).

3.5.1 Life-Cycle Cost Estimates

The life-cycle cost estimates shall be:

1. Explicitly based on the program objectives, operational requirements, contract specifications for the system, and, for ACAT I programs, a program DoD work breakdown structure (WBS) or, for ACAT IA programs, a life-cycle cost and benefit element structure agreed upon by the IPT;
2. Comprehensive in character, identifying all elements of cost that would be entailed by a decision to proceed with development, production, and operation of the system regardless of funding source or management control;
3. For ACAT I programs, consistent with the cost estimates used in the analysis of alternatives, the manpower estimates behind the operation and support costs shall be consistent with the manpower estimate; and,
4. Neither optimistic nor pessimistic, but based on a careful assessment of risks and reflecting a realistic appraisal of the level of cost most likely to be realized.

For ACAT I programs, the DoD Component sponsoring the acquisition program shall establish, as a basis for the life-cycle cost estimates, a description of the salient features of the acquisition program and of the system itself. This description, referred to here as a Cost Analysis Requirements Description (CARD), shall be given to the teams preparing the program office life-cycle estimate, component cost analysis, and independent life-cycle cost estimate 180 days in advance of a planned Overarching Integrated Product Team (OIPT) or Component review, unless another due date is agreed to by the OIPT. The CARD shall be flexible, tailored, and make reference to information available in other documents available to the cost estimators. For joint programs, the CARD shall include the common program as agreed to by all participating DoD Components as well as all unique program requirements of the participating DoD Components. For ACAT IA programs, the PM shall prepare the CARD in coordination with the appropriate IPT members.

For all ACAT ID programs, and for those ACAT IC programs as requested by the **USD(AT&L)**, the Office of the Secretary of Defense (OSD) CAIG shall prepare an independent life-cycle cost estimate and a report for the appropriate MDA for all Milestone reviews, after Milestone **A**. For programs with significant cost risk or high visibility, the CAE may request that a component cost analysis estimate also be prepared in addition to the program office life-cycle cost estimate.

For all ACAT IC programs, except those reviewed by the CAIG, a Component cost agency that is not directly responsible for carrying out the development or acquisition of the program shall prepare an independent life-cycle cost estimate and a report for the appropriate MDA for all Milestone reviews, after Milestone **A**.

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For all ACAT IA programs, the PSA or sponsoring DoD Component shall ensure that a Component cost analysis is created for Milestone **B** and updated for Milestone **C**. The MDA may direct an updated analysis for subsequent decisions points, if conditions warrant. At Milestone **B**, the component may conduct a sufficiency review of the PM's life-cycle cost estimate in lieu of a full analysis. The IPT shall establish the content for the sufficiency review.

3.5.2 Manpower Estimates *

The manpower estimate shall:

1. Outline the DoD Component's official manpower position;
2. Address whether the program is affordable from a military end strength and civilian work year perspective;
3. Clearly state the risks associated with achieving manpower numbers reported in the estimate; and
4. Consider the program objectives, but shall base the estimate on a careful assessment of the risks and a realistic appraisal of the level of improvements most likely to be realized.

The manpower estimate shall report the total number of personnel needed to operate, maintain, support, and provide training for the program upon full operational deployment. It shall report the number of military (officer, warrant officer, and enlisted), DoD civilian, and contract manpower requirements for each fiscal year of the program beginning with initial fielding and ending with full operational deployment. A separate estimate shall be provided for each Component (for joint programs) and separately for the Active, Reserve, and National Guard forces.

The estimate shall report manpower requirements and authorizations (as military end-strengths and civilian work years) for each fiscal year, and shall indicate if there are any resource shortfalls for any fiscal year covered in the report. The report shall state whether any increase in military end strengths or civilian work years (beyond what is included in the Future Years Defense Program) or whether waivers to existing manpower constraints will be required to support full operational deployment of the system. The report shall also address whether the manpower requirements represent an increase over what was required for the predecessor (replaced) system(s), as appropriate, and whether the manpower objectives and thresholds in the ORD, if established, were met or exceeded. For ACAT ID programs, the office of the Under Secretary of Defense for Personnel and Readiness shall review the report and provide an assessment to the OIPT.

*Not applicable to ACAT IA programs.

3.6 Program Plans

Program plans belong to the PM and are to be used by the PM to manage program execution throughout the life-cycle of the program. Program plans are a description of the detailed activities necessary to carry out the strategies addressed above. The PM, in

coordination with the PEO, determines the type and number of program plans. Program plans, excluding the TEMP, are not required in support of milestone decisions and shall not be used as milestone documentation or as periodic reports.

¹ Title 44, United States Code, 3506, Federal agency responsibilities (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

² Title 10, United States Code, Section 2220(a)(1), Performance based management: acquisition programs

³ Title 10, United States Code, Section 2435, Baseline description

⁴ Title 10, United States Code, Section 2220(a)(2), Performance based management: acquisition programs

⁵ Title 10, United States Code, Section 181, Joint Requirements Oversight Council

⁶ Title 10, United States Code, Section 181, Joint Requirements Oversight Council

⁷ Title 10, United States Code, Section 2435(b), Baseline description

⁸ Title 10, United States Code, Section 2220(a)(1), Performance based management: acquisition programs

⁹ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5123, Performance And Results-Based Management

¹⁰ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5202, Incremental Acquisition Of Information Technology

¹¹ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5201, Procurement Procedures

¹² Title 15, United States Code, Section 644(a) Awards or Contracts Determination & (j) Small Purchase Procedures

¹³ Title 15, United States Code, Section 637(d)(4)-(6), Additional Powers

¹⁴ Public Law 100-533, Women's Business Ownership Act of 1988

¹⁵ Title 15, United States Code, Section 644(d), Priority

¹⁶ Title 10, United States Code, Section 2377, Preference for acquisition of commercial items

¹⁷ Federal Acquisition Regulation, Part 2.101, Definitions

¹⁸ Federal Acquisition Regulation, Part 2.101, Definitions

¹⁹ Defense Federal Acquisition Regulation Supplement, Part 225, Foreign Acquisition

²⁰ Title 10, United States Code, Section 2440, Technology and Industrial Base Plans

²¹ Title 10, United States Code, Section 2401, Lease of vessels, aircraft, and vehicles

²² Title 5, United States Code, 306, Strategic Plans (part of Government Performance and Results Act (GPRA))

²³ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5123, Performance And Results-Based Management

²⁴ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5201, Procurement Procedures

²⁵ Defense Federal Acquisition Regulation Supplement, Paragraph 235.006 Contract methods and contracting type

²⁶ Federal Acquisition Regulation, Part 17.1, Multiyear contracting

²⁷ Title 10, United States Code, Section 2306b, Multiyear contracts

²⁸ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5202, Incremental Acquisition Of Information Technology

²⁹ Federal Acquisition Regulation, Part 6.3, Other Than Full and Open Competition

³⁰ Defense Federal Acquisition Regulation Supplement, Appendix D, Component Breakout

³¹ Title 41, United States Code, Section 418(a), Advocates for competition

³² Title 10, United States Code, Section 2318, Advocates for competition

³³ Title 10, United States Code, Section 2318, Advocates for competition

³⁴ DoD 7000.14-R, Volume 2B, "DoD Financial Management Regulation (Budget Formulation and Presentation)," May 1994

³⁵ Defense Federal Acquisition Regulation Supplement, Section 207.105, Contents of written acquisition plans

³⁶ Defense Federal Acquisition Regulation Supplement, Section 227, Patents, Data and copyrights

³⁷ Defense Federal Acquisition Regulation Supplement, Section 252, Solicitation Provisions and Contract Clauses

³⁸ Title 44, United States Code (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

³⁹ Federal Advisory Committee Act, Public Law 92-463, October 6, 1972

⁴⁰ Title 10, United States Code, Section 2350a(g), Cooperative Opportunities Document

⁴¹ Title 10, United States Code, Section 2311(c), Assignment and delegation of procurement functions and responsibilities, Approval of terms and reductions of joint acquisition programs

⁴² Federal Acquisition Regulation, Part 42.302(a), Contract administration functions

⁴³ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁴⁴ Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

⁴⁵ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁴⁶ Department of Defense Directive 3200.11, Major Range and Test Facility Base, September 29, 1980 (Changes 1-3)

⁴⁷ Title 42, United States Code, Section 4321-4347, National Environmental Policy Act

⁴⁸ Executive Order 12114, Environmental Effects Abroad of Major Federal Actions

⁴⁹ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁵⁰ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁵¹ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁵² Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

⁵³ Title 10, United States Code, Section 2366, Major systems and munitions programs: survivability and lethality testing required before full-scale production

⁵⁴ Title 10, United States Code, Section 2350a(g), Side-by-Side Testing

⁵⁵ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

⁵⁶ Title 10, United States Code, Section 2434, Independent cost estimates; operational manpower requirements

⁵⁷ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control

⁵⁸ Title 44, United States Code, 3506, Federal agency responsibilities (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

Part 4

Program Design

4.1 Purpose

The purpose of this part is to establish the basis for a comprehensive, structured, integrated and disciplined approach to the life-cycle design of major weapons and automated information systems, and is applicable to all major acquisition programs.

4.2 Integrated Product and Process Development

The PM shall employ the concept of Integrated Product and Process Development (IPPD) throughout the program design process to the maximum extent practicable. The use of Integrated Product Teams (IPTs) is a key tenet of IPPD.

The IPPD management process shall integrate all activities from product concept through production and field support, using multidisciplinary teams to simultaneously optimize the product and its manufacturing and supportability to meet cost and performance objectives. It is critical that the processes used to manage, develop, manufacture, verify, test, deploy, operate, support, train people, and eventually dispose of the system be considered during program design.

4.3 Systems Engineering

The Program Manager shall ensure that a systems engineering process is used to translate operational needs and/or requirements into a system solution that includes the design, manufacturing, test and evaluation, and support processes and products. The systems engineering process shall establish a proper balance between performance, risk, cost, and schedule, employing a top-down iterative process of requirements analysis, functional analysis and allocation, design synthesis and verification, and system analysis and control.

The systems engineering process shall:

1. Transform operational needs and requirements (reference **CJCSI 3170.01A**) into an integrated system design solution through concurrent consideration of all life-cycle needs (i.e., development, manufacturing, test and evaluation, verification, deployment, operations, support, training and disposal).
2. Ensure the compatibility, interoperability and integration of all functional and physical interfaces and ensure that system definition and design reflect the requirements for all system elements: hardware, software, facilities, people, and data; and
3. Characterize and manage technical risks.

The key systems engineering activities that shall be performed are:

1. Requirements Analysis. Throughout the acquisition process the program office shall work with the user to establish and refine operational and design requirements that result in the proper balance between performance and cost within affordability

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constraints. Requirements analysis shall be conducted iteratively with functional analysis/allocation to develop and refine system level functional and performance requirements, external interfaces and provide traceability among user requirements and design requirements.

2. Functional Analysis/Allocation. Functional analysis/allocation shall be performed iteratively to define successively lower level functional and performance requirements, including functional interfaces and architecture. Functional and performance requirements shall be traceable to higher level requirements. System requirements shall be allocated and defined in sufficient detail to provide design and verification criteria to support the integrated system design.
3. Design Synthesis and Verification. Design synthesis and verification activities shall translate functional and performance requirements into design solutions to include: alternative people, product and process concepts and solutions, and internal and external interfaces. These design solutions shall be in sufficient detail to verify requirements have been met. The verification of the design shall include a cost-effective combination of design analysis, design modeling and simulation, and demonstration and testing. The verification process shall address the design tools, products, and processes.
4. System Analysis and Control. System analysis and control activities shall be established to serve as a basis for evaluating and selecting alternatives, measuring progress, and documenting design decisions. This shall include:
 - a. The conduct of trade-off studies among requirements (operational, functional and performance), design alternatives and their related manufacturing, testing and support processes, program schedule and life-cycle cost at the appropriate level of detail to support decision-making and lead to a proper balance between performance and cost.
 - b. The establishment of a risk management process to be applied throughout the design process. The risk management effort shall address the identification and evaluation of potential sources of technical risks based on the technology being used and its related design, manufacturing capabilities, potential industry sources, test and support processes, risk mitigation efforts, and risk assessment and analysis. Technology transition planning and criteria shall be established as part of the overall risk management effort.
 - c. A configuration management process to control the system products, processes and related documentation. The configuration management effort includes identifying, documenting, and verifying the functional and physical characteristics of an item; recording the configuration of an item; and controlling changes to an item and its documentation. It shall provide a complete audit trail of decisions and design modifications.
 - d. An integrated data management system to capture and control the technical baseline (configuration documentation, technical data, and technical manuals); provide data correlation and traceability among requirements, designs, decisions, rationale, and other related program planning, and reporting, support configuration

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procedures, and serve as a ready reference for the systems engineering effort. PMs shall use existing information systems and data formats rather than DoD-unique systems and formats provided they can readily meet the program's information requirements and do not pose compatibility issues with operational DoD information systems and data.

e. The establishment of performance metrics to provide measures of how well the technical development and design are evolving relative to what was planned and relative to meeting system requirements in terms of performance, risk mitigation, producibility, cost and schedule. Performance metrics must be traceable to performance parameters identified by the operational user.

f. The establishment of interface controls to ensure all internal and external interface requirement changes are properly recorded and communicated to all affected configuration items.

g. A structured review process to demonstrate and confirm completion of required accomplishments and their exit criteria as defined in program planning. Reviews necessary to demonstrate, confirm, and coordinate progress shall be incorporated into overall program planning.

The following areas reflect important consideration in the design and shall be part of the systems engineering process. The extent of their consideration and impact on the product design shall be based on the degree to which they impact total system cost, schedule and performance, at an acceptable level of risk.

4.3.1 Manufacturing and Production*

The producibility of the system design shall be a priority of the development effort. Design engineering efforts shall focus on concurrent development of producible designs, capable manufacturing processes, and process controls to ensure requirements satisfaction and minimize manufacturing costs. The use of existing manufacturing processes shall be capitalized upon whenever possible. When new manufacturing capabilities are required, flexibility (i.e., insensitivity to rate and product configuration) shall be considered.

Full rate production of a system shall not be approved until the system's design has been stabilized, the manufacturing processes have been proven, and the production facilities and equipment are in place (or are being put in place).

*Not applicable to ACAT IA programs.

4.3.2 Quality

The PM shall allow contractors the flexibility to define and use their preferred quality management process that meets program objectives. Third party certification or registration of a supplier's quality system shall not be required. The quality management process shall include the following key quality activities:

1. Establishment of capable processes,

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2. Monitoring and control of critical processes and product variation,
3. Establishment of mechanisms for feedback of field product performance,
4. Implementation of an effective root cause analysis and corrective action system, and
5. Continuous process improvement.

4.3.3 Acquisition Logistics

The PM shall conduct acquisition logistics management activities throughout the system development to ensure the design and acquisition of systems that can be cost-effectively supported and to ensure that these systems are provided to the user with the necessary support infrastructure for achieving the user's peacetime and wartime readiness requirements.

4.3.3.1 Supportability Analyses

Supportability analyses shall be conducted as an integral part of the systems engineering process beginning at program initiation and continuing throughout program development. Supportability analyses shall form the basis for related design requirements included in the system specification and for subsequent decisions concerning how to most cost-effectively support the system over its entire life-cycle. Programs shall allow contractors the maximum flexibility in proposing the most appropriate supportability analyses.

4.3.3.2 Support Concepts

Acquisition programs shall establish logistics support concepts (e.g., two level, three level) early in the program and refine them throughout the development process. Life-cycle costs shall play a key role in the overall selection process. Support concepts for new and future weapon systems shall provide for cost effective total life-cycle logistics support.

4.3.3.3 Support Data

Data requirements shall be consistent with the planned support concept and represent the minimum essential to effectively support the fielded system. Government requirements for contractor developed support data shall be coordinated with the data requirements of other program functional specialties to minimize data redundancies and inconsistencies.

4.3.3.4 Support Resources

Support resources such as operator and maintenance manuals, tools, support equipment, training devices, etc. for major weapon system components shall not be procured before the weapon system/component hardware and software design stabilizes. The PM shall consider the use of embedded training and maintenance techniques to enhance user capability and reduce life-cycle costs. Where they are available, cost-effective, and can readily meet the user's requirements, commercial support resources shall be used.

DoD automatic test system (ATS) families or COTS components that meet defined ATS capabilities shall be used to meet all acquisition needs for automatic test equipment hardware and software. ATS capabilities shall be defined through critical hardware and software

elements. The introduction of unique types of ATS into the DoD field, depot, and manufacturing operations shall be minimized, and the selection shall be based on a cost and benefit analysis that ensures that the ATS chosen is the most beneficial to the DoD over the system life cycle.

4.3.4 Open Systems Design

PMs shall address the use of open standards in the design of all systems elements (mechanical, electrical, software, etc.). The design effort shall select open standards for interfaces based on the criteria described in the open systems strategy (see 3.3.1). Interfaces are internal, external, physical and functional. Selected interfaces shall be controlled by standards adopted by recognized standards organizations whenever possible. When these standards are not effective, *de facto* standards (set by the market place) shall be used. This approach shall be followed to develop a standards-based architecture in designing systems. PMs shall document means for assuring conformance to open standards and determining the extent of openness of system, subsystems, and/or components at the levels specified in 3.3.1.

4.3.5 Software Engineering

Software shall be managed and engineered using best processes and practices that are known to reduce cost, schedule, and performance risks. It is DoD policy to design and develop software systems based on systems engineering principles (**CCA¹**), to include:

1. Developing software system architectures that support open system concepts; exploit commercial off-the-shelf (COTS) computer systems products; and provide for incremental improvements based on modular, reusable, extensible software;
2. Identifying and exploiting software reuse opportunities, Government and commercial, before beginning new software development;
3. Selection of programming language in the context of the systems and software engineering factors that influence overall life-cycle costs, risks, and potential for interoperability. Additional guidance is contained in **ASD(C3I) memorandum, "Use of the Ada Programming Language," April 29, 1997²**;
4. Use of DoD standard data. Additional guidance is contained in **DoDD 8320.1³**;
5. Selecting contractors with the domain experience in developing comparable software systems, a successful past performance record, and a demonstrable mature software development capability and process; and
6. Use of a software measurement process in planning and tracking the software program, and to assess and improve the software development process and associated software product.
7. Ensuring that information operations risks have been assessed (**DoDD S-3600.1⁴**).
8. Ensuring software is Year-2000 compliant.

4.3.6 Reliability, Maintainability and Availability

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The PM shall ensure that reliability, maintainability, and availability activities are established early in the acquisition cycle to assure meeting operational requirements and reduced life-cycle ownership cost. Reliability, maintainability, and availability requirements shall be based on operational requirements and life-cycle cost considerations; stated in quantifiable, operational terms; measurable during developmental and operational test and evaluation; and defined for all elements of the system, including support and training equipment. They shall be derived from and directly support system readiness objectives. Reliability requirements shall address both mission reliability and logistic reliability. Maintainability requirements shall address servicing, preventive, and corrective maintenance. Availability requirements shall address the readiness of the system.

The PM shall plan and execute reliability, maintainability, and availability design, manufacturing development and test activities such that equipment used to demonstrate system performance prior to production reflects the mature design. Demonstrations shall use production representative systems (or as near as possible) and actual operational procedures (e.g., actual technical orders, spare parts, tools, support equipment, and personnel with representative skill levels).

4.3.7 Environment, Safety, and Health

All programs, regardless of acquisition category, shall comply with this section and be conducted in accordance with applicable federal, state, interstate, and local environmental laws and regulations, Executive Orders (EOs), treaties, and agreements. The PM shall ensure that the system can be tested, operated, maintained, repaired, and disposed of in compliance with environmental regulations and the requirements of this section.

Environmental, safety, and health (ESH) analyses shall be conducted, as described below, to integrate ESH issues into the systems engineering process and to support development of the Programmatic ESH Evaluation (see 3.3.7).

4.3.7.1 National Environmental Policy Act

The PM shall comply with the National Environmental Policy Act (NEPA) (**42 USC 4321-4370d⁵**), implementing regulations (**40 CFR 1500-1508⁶**), and executive orders (**EO 12114⁷** and **EO 11514⁸**) by analyzing actions proposed to occur in upcoming program phases that may require NEPA or EO analysis and providing the MDA with milestones and status for each planned analysis. Any analysis required under either NEPA or EO must be completed before the appropriate official may make a decision to proceed with a proposed action that may affect the quality of the human environment. NEPA and EO analysis is tied to proposed, program-specific actions. NEPA and EO documentation shall be prepared in accordance with DoD Component implementation regulations and guidance. The CAE is the final approval authority for system-related NEPA and EO documentation. The PM shall forward a copy of final NEPA documentation for ACAT I programs to the Defense Technical Information Center for archiving.

4.3.7.2 Environmental Compliance

Environmental regulations are a source of external constraints that must be identified and integrated into program execution. To minimize the cost and schedule risks that changing regulations represent, the PM shall regularly review environmental regulations and shall analyze the regulations and evaluate their impact on the program's cost, schedule, and performance.

4.3.7.3 System Safety and Health

The PM shall identify and evaluate system safety and health hazards, define risk levels, and establish a program that manages the probability and severity of all hazards associated with development, use, and disposal of the system. All safety and health hazards shall be managed consistent with mission requirements and shall be cost-effective. Health hazards include conditions that create significant risks of death, injury, or acute chronic illness, disability, and/or reduced job performance of personnel who produce, test, operate, maintain, or support the system.

Each management decision to accept the risks associated with an identified hazard shall be formally documented. The CAE shall be the final approval authority for acceptance of high risk hazards. All participants in joint programs shall approve acceptance of high risk hazards. Acceptance of serious risk hazards may be approved at the PEO level.

EO 12196⁹ and **DoDI 6055.1¹⁰** make Federal Occupational Safety and Health Act regulations applicable to all federal employees working in non-military-unique DoD operations and workplaces, regardless of whether work is performed by military or civilian personnel. In the case of military-unique equipment, systems, operations, or workplaces, Federal safety and health standards, in whole or in part, apply to the extent practicable.

4.3.7.4 Hazardous Materials

The PM shall establish a hazardous material management program that ensures appropriate consideration is given to eliminating and reducing the use of hazardous materials in processes and products rather than simply managing pollution created (**EO 12856¹¹**). The selection, use, and disposal of hazardous materials shall be evaluated and managed considering environmental, safety, and health factors so that the DoD incurs the lowest cost required to protect human health and the environment over the system's life-cycle, consistent with the program's cost, schedule, and performance goals. Where a hazardous material use cannot be avoided, the PM shall develop and implement plans and procedures for identifying, minimizing use of, tracking, storing, handling, packaging, transporting, and disposing of such materials and equipment.

As alternate technology becomes available, the PM shall replace hazardous materials in the system through changes in the system design, manufacturing, and maintenance processes, where technically and economically practical. To minimize costs, the PM whenever possible shall work with the contractor and other PMs in identifying and testing mutually acceptable alternatives. Defense Contract Management Command shall coordinate this effort at contractor facilities under its cognizance. Where the Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP) is providing contract management, the PM shall coordinate with SUPSHIP. The Contract Administration Office shall lead joint efforts by helping identify technical requirements, coordinate PM funding strategies, administer evaluation activities, and implement solutions.

4.3.7.5 Pollution Prevention

In designing, manufacturing, testing, operating, maintaining, transporting, and disposing of systems, all forms of pollution shall be prevented or reduced at the source whenever feasible. Pollution that cannot be prevented or reduced at the source shall be recycled or reused in an

environmentally safe manner. Pollution that cannot be prevented or recycled shall be treated in an environmentally safe manner. Disposal or other release to the environment shall be employed only as a last resort; shall be conducted in an environmentally safe manner; and shall be monitored as required.

The PM shall establish a pollution prevention program to help minimize environmental impacts and the life-cycle costs associated with environmental compliance. The PM shall identify the following: the impacts of the system on the environment during its life (including disposal), actions needed to prevent or control the impacts, the types and amounts of pollution that will be released to the environment, ESH risks associated with using the new system, and other information needed to identify source reduction, alternative technologies, and recycling opportunities.

Many opportunities for pollution prevention can be incorporated into contract documents. In developing work statements, specifications, and other product descriptions, **EO 12873**¹² requires PMs to eliminate the use of virgin material requirements as practicable, and consider use of recovered materials, reuse of products, life-cycle cost, recyclability, use of environmentally preferable products, waste prevention (including toxicity reduction or elimination), and ultimately, disposal, as appropriate (see **FAR 11.301**¹³).

4.3.8 Human Systems Integration (HSI)

A comprehensive management and technical strategy for human systems integration shall be initiated early in the acquisition process to ensure that: human performance; the burden the design imposes on manpower, personnel, and training (MPT); and safety and health aspects are considered throughout the system design and development processes.

Human factors engineering requirements shall be established to develop effective human-machine interfaces, and minimize or eliminate system characteristics that require extensive cognitive, physical, or sensory skills; require excessive training or workload for intensive tasks; or result in frequent or critical errors or safety/health hazards. The capabilities and limitations of the operator, maintainer, trainer, and other support personnel shall be identified prior to program initiation (usually Milestone **B**), and refined during the development process. Human-machine interfaces shall comply with the mandatory guidelines for all C4I systems, automated information systems, and weapons systems that must interface with C4I systems or automated information systems, as defined in the DoD Joint Technical Architecture (JTA).

Reports, plans, and program decisions made by the HSI communities outside the acquisition infrastructure (e.g., manning documents and personnel occupational specialty decisions) must reflect and, to every extent possible, be reflected in program design decisions, trade-offs, risk assessments, and test results.

4.3.9 Interoperability

Compatibility, interoperability and integration are key goals that must be satisfactorily addressed for all acquisition programs. These goals shall be specified and validated during the requirements generation process. Satisfaction of these requirements shall be addressed throughout the acquisition life-cycle for all acquisition programs. The DoD JTA is mandatory for all emerging systems and systems upgrades. The JTA applies to all Command, Control, Communications, Computers, and Intelligence (C4I) and automated information systems, and

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the interfaces of other key assets (e.g. weapons systems, sensors) with C4I systems. The Component Acquisition Executive may grant waivers to the standards in the JTA with the concurrence of the ***USD(AT&L)*** and the ASD(C3I). Interoperability of C4I Systems shall be in compliance with ***DoDD 4630.5***¹⁴, ***DoDI 4630.8***¹⁵, and ***CJCSI 6212.01A***¹⁶. (***CCA***¹⁷ and ***PRA***¹⁸)

4.4 Other Design Considerations

The following requirements shall be considered as part of program design. While all requirements must be considered, it is recognized that all may not apply.

4.4.1 Survivability

Unless waived by the MDA, mission-critical systems, regardless of ACAT, shall be survivable to the threat levels anticipated in their operating environment. System (to include the crew) survivability from all threats found in the various levels of conflict shall be considered and fully assessed as early as possible in the program, usually during System Development and Demonstration.

4.4.2 Work Breakdown Structure

A program work breakdown structure (WBS) shall be established that provides a framework for program and technical planning, cost estimating, resource allocations, performance measurements, and status reporting. It is a product of the systems engineering process.

The WBS and associated WBS dictionary shall define the total system to be developed or produced; display the total system as a product-oriented family tree composed of hardware, software, services, data, and facilities; and relate the elements of work to each other and to the end product.

Program offices shall tailor a program WBS for each program using the guidance in MIL-HDBK-881. MIL-HDBK-881 shall be cited in solicitations and contracts “for guidance only” in extending the program WBS to develop the complete contract WBS.

4.4.3 Standardization Documentation

Preference shall be given to specifications and standards developed under the Defense Standardization Program. This ***Memorandum*** authorized the publication of DoD 4120.3-M that describes the Defense Standardization and Parts Management Program.

4.4.4 Metric System

The metric system of measurement shall be used for all elements of defense systems requiring new design, unless waived by the MDA as not in the best interest of the government (***15 USC 205a-205k19, and EO 1277020***).

4.4.5 Program Protection

Acquisition programs shall identify elements of the program, classified or unclassified, that require protection to prevent unauthorized disclosure or inadvertent transfer of critical

program technology or information. Program protection planning shall begin early in the acquisition life-cycle and be updated as required. The planning process shall incorporate risk management and threat-based countermeasures to provide cost-effective protection. Systems engineering activities shall encourage, as technology advances allow, a process which makes use of encryption, packaging/bundling, and other tamper-proofing techniques to ensure maximum protection of all critical program technology or information. When appropriately applied, the process meets the requirements of information systems security, defensive information warfare, classification management, TEMPEST, physical security, personnel security, operations security, international security, technology transfer, and special access programs.

4.4.6 Information Assurance

Information systems shall be managed and engineered using best processes and practices that are known to reduce security risks, including the risks to timely accreditation. Information assurance requirements shall be included as part of program and systems design activities to ensure availability, integrity, authentication, confidentiality, and non-repudiation of critical program technology and information. This includes providing for the restoration of information systems by incorporating protection, detection, and reaction capabilities. Information assurance requirements shall be established and maintained throughout the acquisition life-cycle for all ACAT IA programs and others as applicable. All AISs shall meet security requirements in accordance with **DoDD 5200.28**²¹ and be accredited by the Designated Approving Authority prior to processing classified or sensitive unclassified data. Exceptions to the DoDD 5200.28 requirement to use trusted computer products listed on the Evaluated Products List shall be granted only by the Deputy CIO/DASD(CIO Policy and Implementation). (**CCA**²² and **PRA**²³)

4.4.7 Electromagnetic Environmental Effects (E3) and Spectrum Management

All electric or electronic systems shall be designed to be mutually compatible with other electric or electronic equipment within their expected operational environment. For additional information, see **DoDD 3222.3**²⁴.

Systems and equipment that emit or receive hertzian waves shall comply with **OMB Circular A-11**²⁵ to determine spectrum supportability prior to initiating cost estimates for development or procurement. All DoD components shall obtain spectrum utilization guidance from the Military Communications-Electronics Board (MCEB) in accordance with **DoDD 4650.1**²⁶.

Systems and equipment shall comply with applicable national and international spectrum management policies and regulations. Requirements for foreign spectrum support shall be forwarded to the MCEB for coordination with host nations where deployment of the system or equipment is planned.

4.4.8 Unplanned Stimuli*

All munitions/weapons shall be designed to withstand unplanned stimuli and use materials consistent with safety and interoperability requirements. Requirements shall be determined during the requirements validation process and shall be updated as necessary throughout the acquisition cycle for all acquisition programs. Interoperability shall be certified per **CJCSI 3170.01**²⁷, to include insensitive munition policies. Waivers for munitions/weapons, regardless of ACAT level, shall require approval by the JROC.

*Not applicable to ACAT IA programs.

4.4.9 Value Engineering

Value Engineering (VE) shall be applied to projects and programs as required by **OMB Circular A-131**²⁸. The PM shall consider an incentive approach and/or a mandatory approach as described in the **FAR 48**²⁹ and the **DFARS 248**³⁰. The VE program can include both internal DoD and contractor activity.

4.4.10 Vertical Integration

PMs shall ensure that the government's definition of its contract requirements does not unnecessarily limit design choices, and that the system engineering process ensures the system design for critical product and technology areas does not unnecessarily restrict subsystem or component choices or limit their sources. Where the system design is necessarily restrictive, PMs shall identify and evaluate the potential for vertical integration and its possible effects on the program (see 3.3.2.4).

4.4.11 Precise Time and Time Interval (PTTI)

To ensure uniformity in PTTI operations, Coordinated Universal Time is the standard for military systems.

¹ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5122, Capital Planning And Investment Control, 5123, Performance And Results-Based Management, and 5202, Incremental Acquisition Of Information Technology

² ASD(C3I) memorandum, "Use of the Ada Programming Language," April 29, 1997

³ Department of Defense Directive 8320.1, DoD Data Administration, September 26, 1991

⁴ Department of Defense Directive S-3600.1, Information Operations, December 9, 1996

⁵ Title 42, United States Code, Section 4321-4370d, National Environmental Policy Act

⁶ Title 40, CFR 1500-1508, National Environmental Policy Act Regulations

⁷ Executive Order 12114, Environmental Effects Abroad of Major Federal Actions

⁸ Executive Order 11514, Protection and Enhancement of Environmental Quality

⁹ Executive Order 12196, Occupational safety and health programs for Federal employees

¹⁰ Department of Defense Instruction 6055.1, DoD Occupational Safety and Health Program (Changes 1-2), October 26, 1984

¹¹ Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements

¹² Executive Order 12873, Federal Acquisition, Recycling, and Waste Prevention

¹³ Federal Acquisition Regulation, 11.301, Policy

¹⁴ Department of Defense Directive 4630.5, Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems, November 12, 1992

¹⁵ Department of Defense Instruction 4630.8, Procedures for Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems, November 18, 1992

¹⁶ CJCS Instruction 6212.01A, Compatability, Interoperability, and Integration of Command, Control, Communications, Computers, and Intelligence Systems, June 30, 1995

¹⁷ Clinger-Cohen Act of 1996 (in P.L. 104-106), 5202, Incremental Acquisition Of Information Technology

¹⁸ Title 44, United States Code, 3506, Federal agency responsibilities (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

19 Title 15, United States Code 205, Metric Conversation

20 Executive Order 12770, Metric Usage in Federal Government Programs

²¹ Department of Defense Directive 5200.28, Security Requirements for Automated Information Systems (AISs), March 21, 1988

²² Clinger-Cohen Act of 1996 (in P.L. 104-106), 5123, Performance And Results-Based Management

²³ Title 44, United States Code, 3504, Authority and functions of Director (amended by Public Law 104-13, Paperwork Reduction Act (PRA) of 1995)

²⁴ Department of Defense Directive 3222.3, Department of Defense Electromagnetic Compatibility Program (EMCP), August 20, 1990

²⁵ Office of Management and Budget Circular A-11, Preparation and Submission of Budget Estimates, June 17, 1988

²⁶ Department of Defense Directive 4650.1, Management and Use of the Radio Frequency Spectrum, June 24, 1987

²⁷ Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01**A**, "Requirements Generation **System**, **August 10, 1999**

²⁸ Office of Management and Budget Circular A-131, Value Engineering

²⁹ Federal Acquisition Regulation 48, Value Engineering

³⁰ Defense Federal Acquisition Regulation Supplement, Part 248, Value Engineering

Part 5

Program Assessments & Decision Reviews

5.1 Purpose

This part establishes mandatory policies and procedures for conducting periodic assessments and milestone decision reviews of Acquisition Category (ACAT) I and ACAT IA programs.

5.2 Defense Acquisition Board

The Defense Acquisition Board (DAB) is the Department's senior-level forum for advising the Under Secretary of Defense (***Acquisition, Technology and Logistics***) (***USD(AT&L)***) on critical decisions concerning ACAT ID programs. The DAB is composed of the Department's senior acquisition officials. The Board is chaired by the ***USD(AT&L)***. The Vice Chairman of the Joint Chiefs of Staff (VCJCS) serves as the vice chairman of the Board. Other principal members of the Board include the Principal Deputy ***USD(AT&L)***; the Under Secretary of Defense (Comptroller); the Assistant Secretary of Defense (Strategy and Threat Reduction); the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I))/DoD Chief Information Officer; the Director of Operational Test and Evaluation (D, OT&E); the Director of Program Analysis and Evaluation (PA&E); the Director of Defense Research and Engineering; the Acquisition Executives of the Army, Navy, and the Air Force; the cognizant Overarching Integrated Product Team (OIPT) Leader; the cognizant Program Executive Officer(s) (PEOs) and Program Manager (PMs); and the DAB Executive Secretary.

The DAB Chairman is also routinely supported by senior advisors, such as but not limited to: the Deputy Under Secretary of Defense (Industrial Affairs & Installations); the Deputy Under Secretary of Defense (Acquisition Reform); the Deputy Under Secretary of Defense (Environmental Security); the Deputy Under Secretary of Defense (Logistics); the Director of Acquisition ***Resources and Analysis***(***ARA***); the Director of the Defense Intelligence Agency (DIA); the Director of Defense Procurement (DP); the Chairman of the Cost Analysis Improvement Group (CAIG); and the Deputy General Counsel (Acquisition and Logistics). Other senior Department officials may be invited by the ***USD(AT&L)*** to participate in DAB meetings on an as-needed basis.

5.2.1 DAB Readiness Meeting

Approximately one week prior to the DAB review, a DAB Readiness Meeting (DRM) shall be held to pre-brief the ***USD(AT&L)***, VCJCS, and the other DAB participants (including cognizant PEO(s) and PM(s)). The purpose of the meeting is to update the ***USD(AT&L)*** on the latest status of the program and to inform the senior acquisition officials of any outstanding issues. Normally, the Overarching Integrated Product Team (OIPT) Leader shall brief the DRM. If outstanding issues are resolved at the DRM, the ***USD(AT&L)*** may decide that a formal DAB meeting is not required and issue an Acquisition Decision Memorandum (ADM) following the DRM. ADMs shall be coordinated with the DAB Principals.

5.3 Reserved

5.4 Integrated Product Teams in the Oversight and Review Process

Integrated Product Teams (IPTs) are an integral part of the defense acquisition oversight and review process. For ACAT ID and IAM programs, there are generally two levels of IPTs: the Overarching IPT (OIPT) and Working-Level IPTs (WIPTs). For each program, there shall be an OIPT and at least one WIPT. WIPTs shall focus on a particular topic such as cost/performance, test, or contracting. An Integrating IPT (IIPT) (which is a WIPT) shall coordinate WIPT efforts and cover all topics not otherwise assigned to another IPT. Participation in IPTs is the primary way for any organization to participate in the program. Mandatory guidance relating to these types of IPTs is provided below.

5.4.1 Overarching IPT Procedures and Assessments

In support of all ACAT ID and IAM programs, an OIPT shall be formed for each program to provide assistance, oversight and review as that program proceeds through its acquisition life-cycle. The OIPT for ACAT ID programs shall be led by the appropriate Office of the Secretary of Defense (OSD) official (typically the Director of Strategic and Tactical Systems or the Director, Program Analysis & Integration, depending on the program in question). The OIPT for ACAT IAM programs is called the Information Technology Overarching Integrated Product Team (IT OIPT) and shall be led by the Director, Performance Assessment, in the Office of the Deputy CIO/DASD(CIO Policy and Implementation). OIPTs shall be composed of the PM, PEO, Component Staff, Joint Staff, ***USD(AT&L)*** staff, and the OSD staff principals or their representatives, involved in oversight and review of a particular ACAT ID or IAM program.

The OIPT shall first form upon learning that a program is intended to be initiated to consider the recommendations proposed by the IIPT; the extent of WIPT support needed for the potential program; who shall participate on the WIPTs; the appropriate milestone for program initiation; and, the minimum information needed for the program initiation review. OIPTs shall meet as necessary over the life of a program. The OIPT Leader shall take action to resolve issues when requested by any member of the OIPT, or when directed by the Milestone Decision Authority (MDA). The goal is to resolve as many issues and concerns at the lowest level possible, and to expeditiously escalate issues that need resolution at a higher level, bringing only the highest level issues to the MDA for decision.

In support of a planned milestone review by the DAB, the OIPT shall normally convene two weeks in advance of the anticipated review to assess information and recommendations being provided to the MDA. Additionally, at that meeting, the PM shall propose the WIPT structure, documentation, and strategy for the next acquisition phase, for approval by the MDA. The OIPT Leader, in coordination with the appropriate CAE, shall recommend to the MDA whether the anticipated review should go forward as planned.

The OIPT leader for ACAT ID programs shall provide an integrated assessment to the DAB chair, principals, and advisors at major program reviews and milestone decision reviews using information gathered through the IPT process. The leader's assessment shall focus on core acquisition management issues and shall take account of independent assessments that are normally prepared by OIPT members. These assessments are typically accomplished in the context of the OIPT review and shall be reflected in the OIPT Leader's report. There should be no surprises at this point, because all team members are already working the issues in real time, and they should be knowledgeable of their OIPT leader's assessment.

5.4.2 Working-Level IPTs Procedures, Roles, and Responsibilities

The PM, or designee, shall form and lead an Integrating IPT (IIPT) to support the development of strategies for acquisition and contracts, cost estimates, evaluation of alternatives, logistics management, cost-performance trade-offs, etc. The IIPT shall assist the PM in the development of a WIPT structure to propose to the OIPT. The IIPT shall also coordinate the activities of the remaining WIPTs and ensure that issues not formally addressed by other WIPTs are reviewed. WIPTs shall meet as required to help the PM plan program structure and documentation and resolve issues. While there is no one-size-fits-all WIPT approach, there are three basic tenets to which any approach shall adhere:

1. The PM is in charge of the program.
2. IPTs are advisory bodies to the PM.
3. Direct communication between the program office and all levels in the acquisition oversight and review process is expected as a means of exchanging information and building trust.

The Leader of each IPT is usually the PM or the PM's representative. The OSD action officer may co-chair the IPT meetings, at the invitation of the PM. The following roles and responsibilities apply to all WIPTs:

1. Assist the PM in developing strategies and in program planning, as requested by the PM
2. Establish IPT plan of action and milestones
3. Propose tailored document and milestone requirements
4. Review and provide early input to documents
5. Coordinate WIPT activities with the OIPT members
6. Resolve or elevate issues in a timely manner
7. Assume responsibility to obtain principals' concurrences on issues, as well as with applicable documents or portions of documents

5.5 Joint Requirements Oversight Council Review Procedures

The Joint Requirements Oversight Council (JROC) shall review all deficiencies that may necessitate development of major systems prior to any consideration by the DAB or, as appropriate, DoD CIO at Milestone **A**. The JROC shall validate an identified mission need, assign a joint potential designator for meeting the need (**CJCSI 3170.01¹**), and forward the Mission Need Statement (MNS) with JROC recommendations to the **USD(AT&L)**.

The JROC shall play a continuing role in the validation of key performance parameters in program baselines prior to DAB, or where applicable, DoD CIO, reviews of ACAT I or ACAT IA programs (including, unless directed by the Secretary or Deputy Secretary of Defense, highly sensitive classified programs) prior to all successive milestone reviews.

In accordance with **10 USC§ 181²**, the Joint Requirements Oversight Council (JROC) shall assist the Chairman of the Joint Chiefs of Staff in the following ways:

1. Identify and assess the priority of joint military requirements (including existing systems and equipment) to meet the national military strategy;

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2. Consider alternatives to any acquisition program that has been identified to meet military requirements by evaluating the cost, schedule, and performance criteria of the program and of the identified alternatives; and
3. Ensure that the assignment of the priorities of joint military requirements conforms to and reflects resource levels projected by the Secretary of Defense through defense planning guidance.

5.6 Cost Analysis Improvement Group Procedures *

The OSD Cost Analysis Improvement Group (CAIG) is established in accordance with **DoDD 5000.4³**. The DoD Component responsible for acquisition of a system shall work with the CAIG providing cost, programmatic, and technical information required to estimate costs and appraise cost risks, and shall facilitate visits of the CAIG staff to the program office, product centers, test centers, and system contractor(s).

Whether for an ACAT ID (or ACAT IC, as requested by the ***USD(AT&L)***) milestone review or a program review:

1. Documentation of draft program office and component cost analysis life-cycle cost estimates shall be given to the CAIG no later than 45 calendar days in advance of the scheduled OIPT or Component review meeting.
2. The program office and component cost analysis life-cycle cost estimates and/or Component cost position prepared as part of an ACAT I milestone review shall be presented to the OSD CAIG at least 21 calendar days before the scheduled OIPT or Component review meeting. The CAIG shall provide feedback based on its independent review of the life-cycle cost estimate(s), validate the methodology used to make the cost estimate(s); and determine whether additional analysis is required.
3. The final program office and component cost analysis (when required by the CAE) life-cycle cost estimates and/or Component cost position shall be given to the CAIG no later than ten calendar days prior to a scheduled OIPT or Component review meeting.

* Not applicable to ACAT IA programs.

5.7 Other Boards and Councils

The ***USD(AT&L)*** and ASD (C3I) are advised by numerous boards and councils on acquisition matters. For example, the Joint Space Management Board (JSMB), which is co-chaired by the ***USD(AT&L)*** and the Deputy Director of Central Intelligence, ensures that defense and intelligence needs for space systems are comprehensively satisfied within available resources, using integrated architectures to the maximum extent possible.

5.8 Program Information

The MDA shall determine what information is necessary to support decisions on an individual ACAT I or ACAT IA program at a particular review point. Information shall be limited to

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the minimum necessary for the decision. There are two major categories of program information: (1) descriptive information, and (2) information subject to approval or consideration.

Descriptive information is a broad category that might include, for example, a description of the system under development, historical background, and ***congressional*** interest. This information is purely descriptive and does not require explicit approval by acquisition executives.

Information subject to approval requires explicit approval by either DoD acquisition executives or submission to Congress (such as a program's key cost, schedule and performance objectives as documented in the Acquisition Program Baseline). Information subject to consideration, (such as an independent cost estimate) shall be provided to the appropriate authority for his or her consideration. Some of this information is required by statute, while some is required by this ***Memorandum***. Some of this information shall be prepared by the PM or DoD Component, while some is prepared by the OSD staff.

Ensuring that the necessary information is produced and distributed to decision-makers is much more important than the particular format in which the information is presented. Thus, in most cases, this ***Memorandum*** does not mandate a particular format; the few exceptions where specific formats are mandatory are clearly stated elsewhere in this document. It is the Department's policy to "tailor-in" (i.e., include appropriate information for the decision maker considering the risk, values, etc. of the specific program) program information on a case-by-case basis, as program circumstances dictate. Tables are provided in the discretionary section of the Defense Acquisition Deskbook that list mandatory as well as discretionary items for each milestone along with example formats.

Finally, PMs are not required to submit mandatory information as stand-alone documents. At the discretion of the PM, required information may be combined into a single document, to the maximum extent practicable. If stand-alone documents are submitted, PMs shall not include redundant information in each document.

5.9 Contractor Management Council

Each Contract Administration Office (CAO) shall form a Management Council with each prime contractor under Defense Contract Management Command (DCMC) cognizance supporting ACAT I, ACAT IA, or ACAT II programs. The Council shall consist of the CAO Commander, Defense Contract Audit Agency Resident Auditor, all affected acquisition management activities (including Program Managers, Item Managers, and Single Process Initiative Component Team Leaders), and a contractor senior level official, or the designated representative for any of the above listed individuals. The purpose of the Council is to assure issues that affect multiple acquisition programs are presented to all stakeholders, solutions worked quickly, and outstanding issues elevated for resolution through appropriate channels. Acquisition managers, or their designees, shall participate in Council activities including providing guidance, coordinating and resolving positions, and supporting Management Council sponsored IPTs. A fundamental Council objective is to identify and implement improvements that streamline the acquisition process. This includes coordinating and integrating program audit and review activity and accepting contractor Single Process Initiative proposals and other ideas that reduce total ownership costs while maintaining performance based requirements.

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¹ Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01 **A**, "Requirements Generation ***System, August 10, 1999***

² Title 10, United States Code, Section 181, Joint Requirements Oversight Committee

³ Department of Defense Directive 5000.4, OSD Cost Analysis Improvement Group, November 24, 1992 (Change 1).

Part 6

Periodic Reporting

6.1 Purpose

Periodic reports provide Milestone Decision Authorities (MDAs) with adequate information to oversee the acquisition process and make necessary decisions. Periodic reports shall be limited to only those required by the MDA or by statute. With the exception of those reports outlined in this Part, the scope and formality of reporting requirements shall be tailored by the MDA.

6.2 Cost, Schedule, and Performance Program Reports

This Part establishes mandatory policies and procedures for accomplishing periodic and phase reporting by:

1. Evaluating program accomplishments and progress towards meeting cost, schedule, and performance goals.
2. Providing periodic reports to MDAs with adequate information to oversee the acquisition process.

6.2.1 Acquisition Program Baseline (APB) Reporting

Program Managers (PMs) shall maintain a current estimate of the program actually being executed and shall report the current estimate of each APB parameter periodically, as requested, to the MDA. The current estimate is the Component and/or PM's most recent estimate of the program's parameters, and usually reflects the current President's Budget as adjusted by fact-of-life changes (i.e., fact-of-life meaning having already happened or unavoidable). For Acquisition Category (ACAT) I and ACAT IA programs, current estimates of the APB parameters shall be reported quarterly in the Defense Acquisition Executive Summary (ACAT I) (see 6.2.2)

6.2.1.1 Program Deviations

A program deviation occurs when the PM has reason to believe that the current estimate of a performance, schedule, or cost parameter is not within the threshold value (as defined in 3.2.1) for that parameter. When a deviation occurs, the PM shall immediately notify the MDA that a program deviation has occurred. Within 30 days of the occurrence of the program deviation, the PM shall notify the MDA of the reason for the program deviation and the actions that need to be taken to bring the program back within the baseline parameters (if this information was not included with the original notification). Within 90 days of the occurrence of the program deviation, one of the following shall have occurred: (1) the program shall be back within APB parameters; (2) a new APB (changing only those parameters that breached) shall have been approved; (3) an OIPT-level program review shall have been conducted to review the PM's proposed baseline revisions and make recommendations to the DAE; or (4) the PM shall at least have provided a date when one of the above three actions will occur.

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For ACAT ID and ACAT IAM programs, if one of these four actions has not occurred within 90 days of the program deviation, the Under Secretary of Defense (***Acquisition, Technology and Logistics (USD(AT&L))***), for ACAT ID programs, the ASD(C3I) for ACAT IAM programs, or the Component Acquisition Executive (CAE), for ACAT IC and ACAT IAC programs, shall require a formal program review to determine program status.

6.2.2 Defense Acquisition Executive Summary* (DD-ACQ(Q) 1429).

The purpose of the Defense Acquisition Executive Summary (DAES) report is to highlight both potential and actual program problems to the ***USD(AT&L)*** before they become significant.

The PM shall propose for ***USD(AT&L)*** consideration tailoring the content of the DAES Report for each program. At a minimum, the DAES is the vehicle for reporting program assessments, unit cost (***10 USC §2433¹***), current estimates (see 6.2.1) of the APB parameters (***10 USC §2435²***), status reporting of exit criteria, and vulnerability assessments (e.g. APB deviation) (***FMFIA³***).

The DAES shall present total costs and total quantities for all years as projected through the end of the acquisition phase. If not identified in the Future Years Defense Program (FYDP), best estimates for costs beyond the FYDP shall be provided in keeping with the concept of total program reporting. The total program concept refers to the entire weapon system acquisition process from concept exploration through production. In the case of programs that are subsystems to platforms and whose procurement is reported in the platform budget line, approved acquisition program funding for such subsystem programs shall be reported. Examples of these subsystem programs include command, control, communications, and intelligence (C3I) electronics, ship electronics suites, and strategic submarine missile weapons equipment that are essentially subsystems of a platform(s).

To facilitate the resolution of data item entry questions and the flow of administrative preparation instructions, DAES report focal points shall be established in the Office of the ***USD(AT&L)***, the Offices of the DoD CAEs, the Offices of the Program Executive Officers (PEOs), and in the reporting PM's office.

6.2.2.1 DAES Reportable Designations

The ***USD(AT&L)*** shall designate which ACAT I programs must prepare DAES reports and assign each program to a quarterly reporting group. The PM shall prepare the report using Consolidated Acquisition Reporting System (CARS) (see Appendix I) and shall promptly submit one hard-copy and one disk to the ***USD(AT&L)*** by the last working day of the program's designated quarterly reporting month. The DAES report shall not be delayed for any reason.

6.2.2.2 Out-of-Cycle DAES Reports

There are two types of out-of-cycle DAES reports:

1. The PM shall submit a DAES report when there is reasonable cause to believe that a Nunn-McCurdy unit cost breach occurred or will occur (***10 USC §2433(c)⁴***). This requirement may be satisfied by submitting a partial DAES consisting of DAES sections 5, 6.2, and 7 (block #28).

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2. If the program deviates from the approved APB thresholds as a result of submission of the Component's program objective memoranda (POM) or the budget estimate submission (BES), the PM shall submit a DAES Section 5., 6.2, and 8.

6.2.2.3 Consistency of Information with Other Documents and/or Reports

The information submitted in the DAES report shall be consistent with that in the latest Acquisition Decision Memorandum (ADM) and Acquisition Program Baseline (APB), and other mandatory or approved program documentation.

*Not applicable to ACAT IA programs.

6.2.3 Major Automated Information System Quarterly Report* DD-C3I(Q) 1799 **[Deleted]**

6.2.4 Selected Acquisition Reports DD-COMP* (Q&A) 823

Selected Acquisition Reports (SARs) shall be prepared and submitted to Congress for all ACAT I programs, in accordance with **10 USC §2432⁵**. The SAR shall be prepared using CARS software.

6.2.4.1 SAR Content and Submission

The SAR provides the status of total program cost, schedule, and performance, as well as program unit cost and unit cost breach information; and, in the case of joint programs, the SAR shall include such information for all joint participants. Each SAR shall also include a full life-cycle cost analysis for the reporting program and its antecedent program.

The SAR for the quarter ending December 31 is called the annual SAR. Each annual (December) SAR, shall be submitted 60 days after the date on which the President transmits the budget to Congress for the following fiscal year. Annual SARs are mandatory for all programs that meet the reporting criteria.

SARs for the quarters ending March 31, June 30, and September 30 are submitted within 45 days after the fiscal year quarter. These quarterly SARs are reported on an exception basis when:

1. the current estimate (see 6.2.1) exceeds the Program Acquisition Unit Cost (PAUC) objective or the Average Procurement Unit Cost (APUC) objective of the currently approved APB, both in base-year dollars, by 15 percent or more;
2. there is a six-month or greater delay in the current estimate of any schedule milestone since the current estimate reported in the previous SAR.
3. Milestone **B** or Milestone **C** and associated APB approval occurs within 90 days prior to the quarterly 'as of date'.

Limited reporting is allowed for pre-Milestone **B** programs. Such programs may submit Research, Development, Test and Evaluation (RDT&E)-only reports that exclude procurement, military construction, and acquisition-related operations and maintenance. DoD Components

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shall submit the names of those programs for which they intend to submit RDT&E-only SARs to the ***USD(AT&L)*** 30 days before the end of the reporting quarter. The ***USD(AT&L)*** shall notify Congress, 15 days before a report is due, of the programs for which limited reports will be submitted.

Whenever the ***USD(AT&L)*** proposes to make changes in the content of a SAR, the Under Secretary shall submit a notice of the proposed changes to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives. The changes shall be considered approved by the Under Secretary, and may be incorporated into the report, only after the end of a **60** day period beginning on the date on which notice is received by those committees.

6.2.4.2 SAR Waivers

The Secretary of Defense may waive the requirement for submission of SARs for a program for a fiscal year if:

1. The program has not entered engineering and manufacturing development;
2. A reasonable cost estimate has not been established for such program; and,
3. The system configuration for the program is not well defined.

As delegated by the Secretary of Defense, the ***USD(AT&L)*** shall submit to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives a written notification of each waiver for a fiscal year not later than 60 days before the President submits the budget to Congress, pursuant to **31 USC §1105⁶** in that fiscal year.

6.2.4.3 SAR Termination

SAR termination shall be considered by the ***USD(AT&L)*** when 90 percent of expected production deliveries or 90 percent of planned acquisition expenditures have been made, or when the program is no longer considered an ACAT I program in accordance with **10 USC §2430⁷**.

*Not applicable to ACAT IA programs.

6.2.5 Unit Cost Reports (UCR) COMP* (Q&AR) 1591

With the exception of pre-Milestone **B** programs reporting RDT&E costs only, UCRs shall be prepared for all ACAT I programs for which SARs are submitted, in accordance with **10 USC §2433⁸**.

6.2.5.1 Unit Cost Content and Submission

Unit cost reporting shall begin with the submission of the initial SAR and shall terminate with the submission of the final SAR.

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The PM shall on a quarterly basis, submit to the CAE a written report on the unit costs of the program. The written report shall be in the DAES. The report shall be provided to the DoD CAE by the last working day of the quarter in accordance with the DAES submission procedures.

The PM shall include in each report the following information:

1. The Current Estimate (see 6.2.1) of the PAUC and the APUC (in base-year dollars).
2. The cost and schedule variances in dollars of the major contracts since the contract was entered into.
3. Any changes from program schedule milestones or program performance reflected in the currently approved APB that are known, expected, or anticipated by the PM .

6.2.5.2 UCR Breaches

The PM shall immediately submit a UCR to the CAE whenever the PM has reasonable cause to believe that:

1. The Current Estimate (see 6.2.1) of either the PAUC or APUC (in base-year dollars) has increased by 15 percent or more over the PAUC or APUC of the currently approved APB (in base year dollars), respectively. This is a Congressionally reportable unit cost breach.
2. The cost of a major contract has increased at least 15 percent or more over the contract cost. This is an internal DoD reportable breach only.

If the CAE determines that there is an increase in the current estimate of the PAUC or APUC cost of at least 15 percent or more over the currently approved APB, the CAE shall inform the ***USD(AT&L)*** and the DoD Component Head concerned.

If the Component Head concerned subsequently determines that there is, in fact, an increase in the Current Estimate of the PAUC or APUC of at least 15 percent over the currently approved APB, the Component Head shall notify Congress in writing of a breach within 45 days after the end of the quarter in the case of a quarterly report, or 45 days after the date of the report in the case of the reasonable cause report. In either case, the notification shall include the date on which the Component Head's determination was made.

In addition, the Component Head shall submit a SAR for either the fiscal year quarter ending on or after the determination date, or for the fiscal year quarter that immediately precedes the fiscal year quarter ending on or after the determination date. This SAR shall contain the additional, breach-related information.

If the current estimate of the PAUC or APUC increases by at least 25 percent over the currently approved APB, the ***USD(AT&L)*** shall submit a written certification to Congress before the end of the 30 day period beginning on the day the SAR containing the unit cost information is required to be submitted to Congress. The certification shall state that:

1. Such acquisition program is essential to the national security.

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2. There are no alternative programs that will provide equal or greater military capability at less cost.
3. The new estimates of the PAUC or APUC are reasonable.
4. The management structure for the acquisition program is adequate to manage and control the PAUC and the APUC.

If the DoD Component Head makes a determination of either a PAUC or APUC 15 percent or more increase and a SAR containing the additional unit cost breach information is not submitted to Congress as required, or if the DoD Component Head makes a determination of a 25 percent increase in the PAUC or APUC and a certification of the ***USD(AT&L)*** is not submitted to Congress as required, funds appropriated for RDT&E, procurement, or military construction may not be obligated for a major contract under the program. If an increase in the PAUC or APUC of 25 percent or more results from the termination or cancellation of an entire program, program certification by the ***USD(AT&L)*** is not required.

*Not applicable to ACAT IA programs.

6.2.6 Annual T&E Oversight List

An Annual T&E Oversight List of programs designated for OSD test and evaluation oversight shall be published by the Director of Operational Test and Evaluation (***D, OT&E***).

6.2.7 Assessing Program Performance for ACAT I Programs*

In the schedule portion of Section 5, Approved Program Data, of the DAES, the PM shall include in the DAES submission the dates for program initiation and initial operating capability (IOC). CARS software will automatically calculate the total time in number of months between those two dates.

Based on the data provided in the latest DAES report for each ACAT I program, the Director, ***ARA*** shall determine, at the end of each fiscal year, and for each program separately, if, as of the last day of the fiscal year, ***10*** percent or less of the total aggregate number of cost, schedule, and performance parameters for that program are breached against the APB threshold. The Director, ***ARA*** shall also assess whether the average period for converting emerging technology to operational capability has decreased by 50 percent or more from the average period required for such conversion as of October 13, 1994. If that determination shows that more than 10 percent of the aggregate number of parameters for an acquisition program are breached or if the assessment finds that the average period of converting technology has not decreased by 50 percent, the MDA shall report that determination and assessment to the Director, ***ARA*** by November 1 of each year. A summary of these determinations and assessments shall be included in the Secretary of Defense Annual report to Congress, in accordance with ***10 USC §2220(b)***⁹. As of October 13, 1994, the average period between program initiation and IOC was 115 months. This number was derived from varied commodities (aircraft, C3I systems, missiles, rockets, satellites, ships, tracked vehicles, and wheeled vehicles), with some requiring more time and some less.

If the Director, ***ARA*** determines that more than 10 percent of the total aggregate number of cost, schedule, and performance parameters for an ACAT I program are in a breach status, the appropriate CAE, and for ACAT ID programs, the appropriate Overarching Integrated Product (OIPT) Leader, or a delegated representative, shall conduct a timely review of the affected ACAT I program. In conducting that review, the CAE and the OIPT Leader, together with the Vice Chairman of the Joint Chiefs of Staff (VCJCS), shall determine whether there is a continuing need for the program that is sufficiently behind schedule, over budget, or not in compliance with performance or capability requirements, and shall recommend to the ***USD(AT&L)*** suitable actions to be taken, including termination, with respect to such program (***10 USC §2220(c)***¹⁰).

*Not applicable to ACAT IA programs.

6.3 Test and Evaluation Reports

This section describes mandatory procedures for required test and evaluation reports.

6.3.1 DoD Component Reporting of Test Results

ACAT I, selected ACAT IAM programs, and other programs designated for OSD test and evaluation oversight require test results reporting.

Formal detailed developmental, operational and live fire test and evaluation reports of the results, conclusions, and recommendations shall be prepared at the end of each testing phase. Copies shall be provided to the ***D, OT&E***. For those reports supporting a milestone or other acquisition decision, the reports shall generally be submitted 45 days in advance of that milestone or decision. Test data shall be made available to the ***D, OT&E*** as testing progresses to support timely preparation of the required reports to Congress.

All developmental and operational evaluation agencies shall identify test limitations and report an assessment of the effect of these limitations on system performance and the resulting effect on the ability of the evaluation agency to assess whether the system tested met technical performance (developmental test and evaluation) or minimum acceptable operational performance requirements (operational test and evaluation).

6.3.2 Live Fire Test and Evaluation Report*

An independent OSD Live Fire Test and Evaluation Report shall be prepared by the D, OT&E within 45 days after receipt of the DoD Component's Live Fire Test Report. The Secretary of Defense (or the D, OT&E if so delegated) shall approve the OSD Live Fire Test and Evaluation Report and submit the report to Congress prior to the decision to proceed beyond low-rate initial production. The report shall address survivability or lethality testing in the following cases:

1. Realistic survivability testing of ACAT I and II covered systems programs or covered product improvement programs (see 3.4.9 above, for definition of a "covered major program").
2. Realistic lethality testing of ACAT I and II major munitions programs, missile programs, or major munitions or missile covered product improvement programs.

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3. Realistic lethality testing of a major munitions program for which more than 1 million rounds (which may be less than an ACAT II program) are planned to be acquired.

* Not applicable to ACAT IA programs.

6.3.3 Beyond Low-Rate Initial Production Report*

Before an ACAT I or D, OT&E-designated program can proceed beyond low-rate initial production, the D, OT&E, shall submit a written report to the Secretary of Defense and Congress. This report is required by **10 USC §2399¹¹**. This report shall assess:

1. The adequacy of conducted operational test and evaluation, and
2. Whether the test and evaluation results confirm that the items or components tested are operationally effective and suitable for use in combat.

In cases where the D, OT&E Beyond Low-Rate Initial Production Report says either that the OT&E was not adequate, or that the system as tested was not effective or not suitable, the D, OT&E shall continue to report his or her assessment of test adequacy and system operational effectiveness and suitability, based on FOT&E, using the D, OT&E Annual Report as a vehicle.

*Not applicable to ACAT IA programs.

6.3.4 Foreign Comparative Test Notifications and Reports to Congress*

The DTSE&E shall notify Congress a minimum of 30 days prior to the commitment of funds for initiation of new Foreign Comparative Test evaluations. These notifications shall be submitted to the House National Security Committee, the Senate Armed Services Committee, and the Appropriations Committees of the Senate and the House of Representatives. This notification is required by **10 USC §2350a(g)¹²**.

The ***USD(AT&L)***, as delegated by the Secretary of Defense, shall include the following information in the biennial report to Congress required by **10 USC §2457(d)¹³**:

1. The foreign non-developmental equipment, software, munitions, and technologies evaluated under **10 USC §2350a(g)¹⁴** and
 - (a) developed by allies of the United States and other friendly countries that completed test and evaluation against Service requirements during the previous fiscal year;
 - (b) procured by the Services during the previous fiscal year as a result of successful test and evaluation; and,
 - (c) selected to initiate and/or continue evaluation in the current fiscal year.
2. The obligation of any funds under **10 USC §2350a(g)¹⁵** for test and evaluation of foreign non-developmental items during the previous fiscal year.

* Not applicable to ACAT IA programs.

6.3.5 Electronic Warfare (EW) Test and Evaluation Reports

Designated Electronic Warfare programs shall report annually their compliance with the EW Test and Evaluation Process. Report applicability, submission format, and date are contained in the DoD EW plan.

6.3.6 Annual Operational Test and Evaluation Reports*

The D, OT&E shall prepare an annual and live fire test and evaluation activities report, in both classified and unclassified form, summarizing all operational test and evaluation and live fire test and evaluation activities within the DoD during the preceding fiscal year. Each such report shall be submitted concurrently to the Secretary of Defense, the ***USD(AT&L)***, and Congress not later than 10 days after transmission of the President's Budget for the next fiscal year to Congress. This report is required by **10 USC §139¹⁶**.

*Not applicable to ACAT IA programs.

6.4 Contract Management Reports

The reports prescribed by this section shall be used for all applicable defense contracts and are required for effective management of defense acquisitions. Use of electronic media shall be required. The Work Breakdown Structure (WBS) used in preparing the reports covered by this section shall be in conformance with the program WBS (see 4.4.2). Except for high-cost or high-risk elements, the normal level of reporting detail required shall be limited to level three of the contract WBS.

6.4.1 Contractor Cost Data Reporting (CCDR)*

Contractor Cost Data Reports (CCDRs) are DoD's primary means of collecting data on the costs that DoD contractors incur in performing DoD programs. Collection of this data is critical to establishing reasonable estimates of the costs of ACAT I programs, and to other analytical requirements. CCDR coverage shall be from the point of commitment to engineering and manufacturing development through the completion of production in accordance with procedures described in this section. CCDR reporting is also required on all advanced development prototype programs.

Unless waived by the Chair, Cost Analysis Improvement Group (CAIG), CCDR reporting is required on all major contracts and subcontracts, regardless of contract type for ACAT I programs, that are valued at more than \$40 million (FY96 constant dollars). CCDR reporting is not required for contracts priced below \$6 million. The requirement for CCDR reporting on high risk or high technical interest contracts priced between \$6 and \$40 million is left to the discretion of the Cost IPT.

CCDR reporting is not required on ship development and construction contracts because of the unique nature of ship construction and because comparable data are available from modified Cost Performance Reports (CPRs). This exclusion does not apply to contracts for shipboard systems (e. g., missile systems.) CCDR reporting is not required for procurement of commercial systems or for non-commercial systems that are bought under firm fixed price contracts that were competitively awarded as long as competitive conditions continue to exist.

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For ACAT I programs, the CCDR plan shall be developed as part of the IPT process and forwarded to the Chair, CAIG for approval. CCDR approval shall be accomplished early, preferably before issuance of a solicitation to industry for advanced development prototype or engineering development contracts. The CCDR plan reflects the proposed collection of cost data for a program. The plan shall provide this information by WBS and shall describe the report forms to be used and the reporting frequency.

Tailoring the CCDR plan and appropriately defining the program WBS are key to achieving a cost-effective reporting system. When appropriate, contractors shall participate early in the IPT process as they often have suggestions that reduce reporting costs while preserving the utility of the data for the government (See 3.3.1).

Each DoD component shall designate, by title, an official who shall:

1. Ensure that policies and procedures are established for implementation of CCDR in accordance with this section, including storage of CCDR data and their distribution to appropriate DoD officials.
2. Ensure that all CCDR plans for ACAT I programs, including any changes, are reviewed and concurred in for compliance with CCDR plans and the program WBS, and are forwarded to the CAIG.
3. Advise the Chair, CAIG annually of the status of all acquisition programs for which CCDR plans are approved for implementation, and any delinquencies or deficiencies in CCDR and the action(s) being taken to remedy these delinquencies or deficiencies.

The need for field reviews of contractor implementation of CCDR shall be assessed annually. The Chair, CAIG is responsible for prescribing a format for submission of CCDRs, implementing policies pertaining to the CCDR system, and monitoring its implementation to ensure consistent and appropriate application throughout the DoD.

The following general policies guide the preparation of the CCDR Plan for all ACAT ID, IC, II, and III programs. In general, the level of detail and frequency of reporting of ACAT II and III programs, normally should be less stringent than those applied to ACAT I programs as specified below:

1. Level of Cost Reporting. Routine reporting shall be at the contract WBS level three for prime contractors and key subcontractors. Detailed (i.e., sub level three) reporting shall be required only for those lower-level elements that address high risk, high value, or high technological interest areas of a program. Identifying these additional elements is a critical early assignment for the Cost IPT.
2. Frequency. CCDRs are fundamentally a “returned” (or actual) cost reporting system and, as such, do not generally need to be filed while work is still pending. Thus, for production contracts, CCDR reports are normally submitted upon the delivery of each annual lot. For developmental contracts, CCDR reports are typically filed after major events such as first flight or completion of prototype lot fabrication, before major milestone reviews, and at contract completion. In general, quarterly or annual reporting requirements do not meet the above requirements. The frequency of reports for development and production contracts shall be

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defined to meet the needs of the program for cost data and is another critical early activity of the Cost IPT process.

* Not applicable to ACAT IA programs.

6.4.2 Cost Performance Report (CPR) DID DI-MGMT-81466 (DoD 5010.12-L¹⁷)

The CPR DD Form 2734/1, 2734/2, 2734/3, 2734/4, and 2734/5 shall be used to obtain contract cost and schedule performance information for use in making and validating program management decisions. This report provides early indicators of contract cost and schedule problems and the effects of management action taken to resolve problems affecting cost and schedule performance.

1. CPRs shall be required on all contracts that require compliance with the Earned Value Management Systems (EVMS) Criteria (see 3.3.5.3 and Appendix VI).
2. CPRs may be required on flexibly-priced (for example, fixed-price incentive or cost type) contracts that do not require compliance with the EVMS criteria, but on which the DoD Components requires more data than is available on the Cost/Schedule Status Report (see 6.4.3). Such applications shall not be used in lieu of a valid EVMS criteria requirement. CPR formats, level of detail, frequency, and variance analysis shall be limited to the minimum necessary for effective management control.
3. CPRs shall not be required on firm fixed price contracts unless unusual circumstances require cost and schedule visibility.
4. Data reported on the CPR shall be summarized directly from the same systems used for internal contractor management.
5. The CPR is subject to tailoring to require less data. All reporting provisions shall be negotiated and specified in the contract, including reporting frequency, variance analysis requirements, and the Contract WBS to be reported. The CPR is intended to be a primary means of communication between the contractor and the PM to report cost and schedule trends to date, and permit assessment of their likely effect on future performance on the contract.

6.4.3 Cost/Schedule Status Report (C/SSR) DID DI-MGMT-81467 (DoD 5010.12-L¹⁸)

The C/SSR DD Form 2735 shall be used to obtain contract cost and schedule performance information on contracts over 12 months in duration where application of the CPR is not appropriate. No specific application thresholds are established; however, application to contracts of less than \$6 million (FY 1996 constant dollars) shall be evaluated carefully to ensure that only the minimum information necessary for effective management control is required. The C/SSR shall not be required on firm fixed price contracts unless unusual circumstances require cost and schedule visibility.

6.4.4 Contract Funds Status Report (CFSR) DI-MGMT-81468 (DoD 5010.12-L¹⁹)

The CFSR, **DD Form 1586**, shall be used to obtain funding data on contracts over six months in duration. The CFSR provides DoD Components with information to assist in updating

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and forecasting contract fund requirements, planning and decision making on funding changes, developing fund requirements and budget estimates in support of approved programs, and determining funds in excess of contract needs and available for deobligation.

No specific application thresholds are established; however, application to contracts of less than \$1.2 million (FY 1996 constant dollars) shall be evaluated carefully to ensure that only the minimum information necessary for effective management control is required. The CFSR shall not be applied on firm fixed price contracts unless unusual circumstances require specific funding visibility.

1. CFSR may be applied to unpriced portions of firm fixed price contracts that individually or collectively are estimated by the DoD Component to be in excess of 20 percent of the initial contract value.
2. In such cases, the contract shall delineate any specific CFSR requirements to be imposed on the contractor to fit the individual circumstances.

6.4.5 Cooperative R&D Projects Report

USD(AT&L) shall report to Congress on the cooperative R&D projects under 10 USC 2350a not later than March 1 of each year. This shall include descriptions of projects, funding, schedules and status both for projects in which the Memoranda of Understanding have been entered into and for proposed projects (**10 USC 2350a(f)²⁰**).

¹ Title 10, United States Code, Section 2433, Unit cost reports

² Title 10, United States Code, Section 2435, Baseline description

³ Federal Managers Financial Integrity Act of 1982, Public Law 97-255

⁴ Title 10, United States Code, Section 2433, Unit cost reports

⁵ Title 10, United States Code, Section 2432, Selected Acquisition Reports

⁶ Title 31, United States Code, Section 1105, Budget contents and submission to Congress

⁷ Title 10, United States Code, Section 2430, Major defense acquisition program defined

⁸ Title 10, United States Code, Section 2433, Unit cost reports

⁹ Title 10, United States Code, Section 2220(b), Performance based management: acquisition programs, Annual Reporting Requirement

¹⁰ Title 10, United States Code, Section 2220(c), Performance based management: acquisition programs, performance evaluation

¹¹ Title 10, United States Code, Section 2399, Operational test and evaluation of defense acquisition programs

¹² Title 10, United States Code, Section 2350, Side-by-Side Testing

¹³ Title 10, United States Code, Section 2457, Standardization of equipment with North Atlantic Treaty Organization members

¹⁴ Title 10, United States Code, Section 2350a(g), Side-by-side Testing

¹⁵ Title 10, United States Code, Section 2350a(g), Side-by-side Testing

¹⁶ Title 10, United States Code, Section 139, Director of Operational Test and Evaluation

¹⁷ Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993

¹⁸ Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993

¹⁹ Department of Defense 5010.12-L, Acquisition Management Systems and Data Requirements Control List, October 1993

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²⁰ Title 10, United States Code, Section 2350a(f), Cooperative research and development projects: allied countries

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Appendices

Appendices

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IV	Live-Fire Test and Evaluation**
V	Major Automated Information System Quarterly Report*** <i>[Deleted]</i>
VI	Earned Value Management Systems Criteria
* ** ***	Not applicable to ACAT IA programs Normally not applicable to ACAT IA programs Not applicable to ACAT I programs

Appendix I

Consolidated Acquisition Reporting System Mandatory Procedures and Formats

CARS is a personal computer-based data entry and reporting software package that maintains and reports information on defense programs. Its use is required for all major defense acquisition programs (MDAPs), but may also be used for non MDAP programs. The system consists of three reporting modules that generate the Acquisition Program Baseline (APB), the Selected Acquisition Report (SAR), and the Defense Acquisition Executive Summary (DAES). Quarterly unit cost and unit cost breach exception reporting additional statutory requirements, are included in the DAES and SAR, respectively. CARS also includes some analysis routines (such as the Computational Module that supports the SAR cost change calculations), and SAR and DAES data checks. A CARS Help Line is maintained to support CARS users.

Use of CARS is controlled by a unique program number identification system, which is assigned to each using program by the ***OUSD(AT&L)*** focal point. Except for narrative/memo type information, the format of the APB, SAR, and DAES is specified by the CARS software.

Some, but not all, of the information is shared between the three reporting modules. This includes the Acquisition Program Baseline, which is reported in the DAES and the SAR, and certain contract information. Some of the information in CARS, such as the SAR and Acquisition Program Baseline, can only be edited by the appropriate ***OUSD(AT&L)*** or Component focal point. Changes in this information must be approved by the appropriate milestone decision authority. A disk containing the revised/new information is distributed by the appropriate ***OUSD(AT&L)*** or Component focal point.

The development and maintenance of CARS and upgrades to the system are the responsibility of the ***OUSD(AT&L)ARA***. Questions, including requests for copies of the software, shall be directed to that organization. Mandatory instructions for preparing the SAR, DAES, UCR, and APB (including administrative procedures) are included with the CARS software and are available on the CARS web page, <http://www.acq.osd.mil/cars>. Sample formats and examples are provided in the automated Defense Acquisition Deskbook.

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Appendix II

Operational Requirements Document
Mandatory Procedures and Format
[Deleted]

Appendix III

Test and Evaluation Master Plan Mandatory Procedures and Format

Introduction and Purpose

This Appendix provides the procedures and formats to implement the requirements of Title 10, United States Code, Section 2399(b)(1), "Operational Test and Evaluation." The Test and Evaluation Master Plan (TEMP) documents the overall structure and objectives of the test and evaluation program. It provides a framework within which to generate detailed test and evaluation plans and it documents schedule and resource implications associated with the test and evaluation program. The TEMP identifies the necessary developmental test and evaluation, operational test and evaluation, and live fire test and evaluation activities. It relates program schedule, test management strategy and structure, and required resources to: (1) Critical operational issues; (2) Critical technical parameters; (3) Objectives and thresholds derived from the Operational Requirements Document (ORD); (4) Evaluation criteria; and (5) Milestone decision points.

For multi-Service or joint programs, a single integrated TEMP is required. Component-unique content requirements, particularly evaluation criteria associated with critical operational issues, can be addressed in a Component-prepared annex to the basic TEMP.

For a program consisting of a collection of individual systems, a Capstone TEMP integrating the test and evaluation program for the entire system is required. Individual system-unique content requirements are to be addressed in an annex to the basic Capstone TEMP. The requirement for a Capstone TEMP is dependent upon the degree of integration and interoperability required to satisfy the total system's objectives and thresholds. Capstone TEMPs use may not be appropriate for major weapon platforms (major defense acquisition programs).

Preparation and Submittal

For Acquisition Category (ACAT) I, selected IAM programs, and other programs designated for OSD test and evaluation oversight, TEMPs shall be developed through the IPT process. TEMPs for ACAT I programs shall be submitted to the Director, ***OT&E*** for OSD approval 30 days prior to first milestone review (excluding Milestone ***A***) of the program. For other programs designated for OSD T&E oversight, TEMPs shall be submitted within 90 days of such designation.

Multi-Service for Joint Programs. The lead Component is responsible for preparation and coordination of the TEMP. Approval signatures on the TEMP signature page are required for the lead Component as well as all other participating DoD Components.

Requirement for Other DoD Component Coordination. Where a program of any Component must interface with other Components during development and testing or

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where it will interface operationally with the systems of other Components, coordination of the affected Components must be obtained and indicated in the TEMP before it is submitted to the ***D, OT&E***.

TEMP Updates. Update the TEMP at milestones, when the program baseline has been breached, or on other occasions when the program has changed significantly. Updates may be made by use of "correction pages."

Review and Approval. The ***D, OT&E and*** shall be the Office of the Secretary of Defense TEMP approval ***authority*** for acquisition category I programs, selected IAM programs, and those other acquisition category programs designated for Office of the Secretary of Defense test and evaluation oversight. Formal submission of the TEMP to ***D, OT&E*** for OSD approval shall be accomplished no later than 30 days before the Milestone Review, unless otherwise agreed to in the IPT.

Circumstances When a TEMP Is No Longer Required. When a program's development is completed and critical operational issues are satisfactorily resolved, including the verification of deficiency corrections, TEMP updates are no longer required. The following attributes are examples for which an updated TEMP submission may no longer be required:

1. Fully deployed system with no operationally significant product improvements or block modification efforts.
2. Full production ongoing and fielding initiated with no significant deficiencies observed in production qualification test results.
3. Partially fielded system in early production phase having successfully accomplished all developmental and operational test objectives.
4. Programs for which planned test and evaluation is only a part of routine aging and surveillance testing, service life monitoring, or tactics development.
5. Programs for which no further operational testing or live fire testing is required by any DoD Component.
6. Program for which future testing (e.g., product improvements or block upgrades) has been incorporated in a separate TEMP (e.g., an upgrade TEMP).

Mandatory Format

The mandatory TEMP format begins on the next page.

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TEST AND EVALUATION MASTER PLAN

FOR

PROGRAM TITLE/SYSTEM NAME

Program Elements

Xxxxx

SUBMITTED BY

Program Manager

DATE

CONCURRENCE

Program Executive Officer
or Developing Agency (if not under the PEO structure)

DATE

Operational Test Agency

DATE

User's Representative

DATE

COMPONENT APPROVAL

Component Test and Evaluation Director

DATE

DoD Component Acquisition Executive (ACAT I) DATE
Milestone Decision Authority (for less-than-ACAT I)

OSD APPROVAL

(ACAT I and other programs designated for OSD test and evaluation oversight)

Director, Operational Test
and Evaluation

DATE

Mandatory TEMP Format and Content

1. **PART I--SYSTEM INTRODUCTION**

- a. **Mission Description.** Reference the Mission Need Statement or briefly summarize the mission need described therein.
- b. **System Threat Assessment.** Reference the system threat assessment and briefly summarize the threat environment described therein.
- c. **Measures of Effectiveness and Suitability.** List the performance (operational effectiveness and suitability) capabilities and characteristics identified as required in the ORD. The critical operational effectiveness and suitability parameters and constraints include manpower, personnel, training, software, computer resources, transportation (lift), compatibility, interoperability and integration, etc. For each listed required capability or characteristic, provide the minimum acceptable value and the objective from the ORD. If the Operational Test Agency (OTA) or the D, OT&E determines that the required capabilities and characteristics contained in the ORD provide insufficient measures for an adequate OT&E, the OTA or D, OT&E shall propose additional measures through the IPT process. Upon receipt of such a proposal, the ORD approval authority shall establish the level of required performance characteristics.
- d. **System Description.** Briefly describe the system design, or reference another program document that includes the following items:
 - (1) Key features and subsystems, both hardware and software (such as architecture, interfaces, security levels, reserves, etc.), allowing the system to perform its required operational mission.
 - (2) Interfaces with existing or planned systems that are required for mission accomplishment. Address relative maturity and integration and modification requirements for nondevelopmental items. Include interoperability with existing and/or planned systems of other DoD Components or allies.
 - (3) Critical system characteristics or unique support concepts resulting in special test and analysis requirements (e.g., post deployment software support, hardness against nuclear effects; resistance to countermeasures; development of new threat simulation, simulators, or targets).
- e. **Critical Technical Parameters**
 - (1) List in a matrix format the critical technical parameters of the system (including software maturity and performance measures) that have been evaluated or will be evaluated during the remaining phases of developmental testing. Critical technical parameters are derived from the ORD, critical system characteristics and technical performance measures and shall include the parameters in the Acquisition Program Baseline. Discuss the relationship between the critical technical parameters and the objectives and thresholds in the ORD.
 - (2) Next to each technical parameter, list the accompanying objectives and thresholds.

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- (3) Highlight critical technical parameters that must be demonstrated before entering the next acquisition or operational test phase and ensure that the actual values that have been demonstrated to date are included in the last column.
- (4) Compatibility, interoperability, and integration (CII) issues critical to the operational effectiveness **or** suitability of the system must be addressed in the user's effectiveness critical operational issues (COI) and associated criteria. Measures of effectiveness (MOEs) and measures of performance (MOPs) developed for each interoperability COI must be stated. Evaluation criteria and data requirements for each interoperability-related MOE/MOP must be clearly defined.

2. PART II--INTEGRATED TEST PROGRAM SUMMARY

a. Integrated Test Program Schedule

- (1) Display on a chart, ***similar to Figure 1***, the integrated time sequencing of the critical test and evaluation phases and events, related activities, and planned cumulative funding expenditures by appropriation.
- (2) Include event dates such as milestone decision points; operational assessments, test article availability; software version releases; appropriate phases of developmental test and evaluation; live fire test and evaluation, JITC interoperability testing, and operational test and evaluation; low rate initial production deliveries; Full Rate Production deliveries; Initial Operational Capability; Full Operational Capability; and statutorily required reports, such as the Live-Fire T&E Report and Beyond-LRIP Report.
- (3) A single schedule shall be provided for multi-Service or Joint and Capstone TEMP's showing all DoD Component system event dates.

b. Management

- (1) Discuss the test and evaluation responsibility of all participating organizations (developers, testers, evaluators, users).
- (2) Provide the date (fiscal quarter) when the decision to proceed beyond low-rate initial production is planned. (Low-rate initial production quantities required for operational test must be identified for approval by the Director of Operational Test and Evaluation prior to Milestone **B** for acquisition category I programs and other acquisition category programs designated for Office of the Secretary of Defense test and evaluation oversight).

3. PART III--DEVELOPMENTAL TEST AND EVALUATION OUTLINE

- a. Developmental Test and Evaluation Overview. Explain how developmental test and evaluation will: verify the status of engineering and manufacturing development progress; verify that design risks have been minimized; and substantiate achievement of contract technical performance requirements; and be used to certify readiness for dedicated operational test. Specifically, identify:
 - (1) Any technology/subsystem that has not demonstrated its ability to contribute to system performance and ultimately fulfill mission requirements.

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- (2) The degree to which system hardware and software design has stabilized so as to reduce manufacturing and production decision uncertainties.
 - b. Future Developmental Test and Evaluation. Discuss all remaining developmental test and evaluation that is planned, beginning with the date of the current TEMP revision and extending through completion of production. Place emphasis on the next phase of testing. For each phase, include:
 - (1) Configuration Description. Summarize the functional capabilities of the system's developmental configuration and how they differ from the production model.
 - (2) Developmental Test and Evaluation Objectives. State the test objectives for this phase in terms of the critical technical parameters to be confirmed. Identify any specific technical parameters that the milestone decision authority has designated as exit criteria and/or directed to be demonstrated in a given phase of testing.
 - (3) Developmental Test and Evaluation Events, Scope of Testing, and Basic Scenarios. Summarize the test events, test scenarios and the test design concept. Quantify the testing (e.g., number of test hours, test events, test firings). List the specific threat systems, surrogates, countermeasures, component or subsystem testing, and testbeds the use of which are critical to determine whether developmental test objectives are achieved. As appropriate, particularly if an agency separate from the test agency will be doing a significant part of the evaluation, describe the methods of evaluation. List all models and simulations to be used, explain the rationale for their credible use and provide their source of verification, validation and accreditation (VV&A). Describe how performance in natural environmental conditions representative of the intended area of operations (e.g., temperature, pressure, humidity, fog, precipitation, clouds, blowing dust and sand, icing, wind conditions, steep terrain, wet soil conditions, high sea state, storm surge and tides, etc.) and interoperability and compatibility with other weapon and support systems, as applicable, to include unplanned stimuli, will be tested.
 - (4) Limitations. Discuss the test limitations that may significantly affect the evaluator's ability to draw conclusions, the impact of these limitations, and resolution approaches.
4. PART IV--OPERATIONAL TEST AND EVALUATION OUTLINE
- a. Operational Test and Evaluation Overview
 - (1) The primary purpose of operational test and evaluation is to determine whether systems are operationally effective and suitable for the intended use by representative users before production or deployment.
 - (2) The TEMP shall show how program schedule, test management structure, and required resources are related to operational requirements, critical operational issues, test objectives, and milestone decision points. Testing shall evaluate the system (operated by typical users) in an environment as operationally realistic as possible, including threat representative hostile forces and the expected range of natural environmental conditions.

b. Critical Operational Issues

- (1) List in this section the critical operational issues. Critical operational issues are the operational effectiveness and operational suitability issues (not parameters, objectives or thresholds) that must be examined in operational test and evaluation to evaluate/assess the system's capability to perform its mission.
- (2) A critical operational issue is typically phrased as a question that must be answered in order to properly evaluate operational effectiveness (e.g., "Will the system detect the threat in a combat environment at adequate range to allow successful engagement?") and operational suitability (e.g., "Will the system be safe to operate in a combat environment?")
- (3) Some critical operational issues will have critical technical parameters and thresholds. Individual attainment of these attributes does not guarantee that the critical operational issue will be favorably resolved. The judgment of the operational test agency is used by the DoD Component to determine if the critical operational issue is favorably resolved.
- (4) If every critical operational issue is resolved favorably, the system should be operationally effective and operationally suitable when employed in its intended environment by typical users.

c. Future Operational Test and Evaluation. For each remaining phase of operational test and evaluation, separately address the following:

- (1) Configuration Description. Identify the system to be tested during each phase, and describe any differences between the tested system and the system that will be fielded including, where applicable, software maturity performance and criticality to mission performance, and the extent of integration with other systems with which it must be interoperable or compatible. Characterize the system (e.g., prototype, engineering development model, production representative or production configuration).
- (2) Operational Test and Evaluation Objectives. State the test objectives including the objectives and thresholds and critical operational issues to be addressed by each phase of operational test and evaluation and the milestone decision review(s) supported. Operational test and evaluation that supports the beyond low rate initial production decision shall have test objectives that examine all areas of operational effectiveness and suitability.
- (3) Operational Test and Evaluation Events, Scope of Testing, and Scenarios. Summarize the scenarios and identify the events to be conducted, type of resources to be used, the threat simulators and the simulation(s) to be employed, the type of representative personnel who will operate and maintain the system, the status of the logistic support, the operational and maintenance documentation that will be used, the environment under which the system is to be employed and supported during testing, the plans for interoperability and compatibility testing with other United States/Allied weapon and support systems as applicable, etc. Identify planned sources of information (e.g., development testing, testing of related systems, modeling, simulation, etc.) that may be used by the operational test agency to supplement this phase of operational test and evaluation. Whenever models and simulations are to be used: identify the planned models and simulations; explain how they are

proposed to be used; and provide the source and methodology of the verification, validation, and accreditation underlying their credible application for the proposed use. If operational test and evaluation cannot be conducted or completed in this phase of testing and the outcome will be an operational assessment instead of an evaluation, this shall clearly be stated and the reason(s) explained.

- (4) Limitations. Discuss the test limitations including threat realism, resource availability, limited operational (military, climatic, nuclear, etc.) environments, limited support environment, maturity of tested system, safety, etc., that may impact the resolution of affected critical operational issues. Indicate the impact of the test limitations on the ability to resolve critical operational issues and the ability to formulate conclusions regarding operational effectiveness and operational suitability. Indicate the critical operational issues affected in parenthesis after each limitation.
- d. Live Fire Test and Evaluation. See also Appendix IV, "Live Fire Test and Evaluation Guidelines". Include a description of the overall live fire test and evaluation strategy for the item; critical live fire test and evaluation issues; required levels of system vulnerability/lethality; the management of the live fire test and evaluation program; live fire test and evaluation schedule, funding plans and requirements; related prior and future live fire test and evaluation efforts; the evaluation plan and shot selection process; and major test limitations for the conduct of live fire test and evaluation. Discuss, if appropriate, procedures intended for obtaining a waiver from full-up, system-level live fire testing (realistic survivability/lethality testing as defined in Section 2366, Title 10 USC) before Milestone **B**. Live fire test and evaluation resource requirements (including test articles and instrumentation) shall be appropriately identified in the Test and Evaluation Resource Summary.

5. PART V--TEST AND EVALUATION RESOURCE SUMMARY

- a. Provide a summary (preferably in a table or matrix format) of all key test and evaluation resources, both government and contractor, that will be used during the course of the acquisition program. Specifically, identify the following test resources:
 - (1) Test Articles. Identify the actual number of and timing requirements for all test articles, including key support equipment and technical information required for testing in each phase by major type of developmental test and evaluation and operational test and evaluation. If key subsystems (components, assemblies, subassemblies or software modules) are to be tested individually, before being tested in the final system configuration, identify each subsystem in the TEMP and the quantity required. Specifically identify when prototype, engineering development, preproduction, or production models will be used.
 - (2) Test Sites and Instrumentation. Identify the specific test ranges/facilities to be used for each type of testing. Compare the requirements for test ranges/facilities dictated by the scope and content of planned testing with existing and programmed test range/facility capability, and highlight any major shortfalls, such as inability to test under representative natural environmental conditions. Identify instrumentation that must be acquired specifically to conduct the planned test program. Describe how environment compliance requirements will be met.

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- (3) Test Support Equipment. Identify test support equipment that must be acquired specifically to conduct the test program.
 - (4) Threat Representation. Identify the type, number, availability, and fidelity requirements for all representations of the threat to be used in testing. Compare the requirements for threat representations with available and projected assets and their capabilities. Highlight any major shortfalls. Each representation of the threat (target, simulator, model, simulation or virtual simulation) shall be subjected to validation procedures to establish and document a baseline comparison with its associated threat and to determine the extent of the operational and technical performance differences between the two throughout the life cycle of the threat representation.
 - (5) Test Targets and Expendables. Identify the type, number, and availability requirements for all targets, flares, chaff, sonobuoys, smoke generators, acoustic countermeasures, etc. that will be required for each phase of testing. Identify any major shortfalls. Each threat target shall be subjected to validation procedures, tailored to characteristics of interest, in order to establish and document a baseline comparison with its associated threat and to ascertain the extent of operational and technical performance differences throughout the threat target's life cycle.
 - (6) Operational Force Test Support. For each test and evaluation phase, identify the type and timing of aircraft flying hours, ship steaming days, and on-orbit satellite contacts/coverage, and other critical operating force support required.
 - (7) Simulations, Models and Testbeds. For each test and evaluation phase, identify the system simulations to be used, including computer-driven simulation models and hardware/software-in-the-loop testbeds. Identify the resources required to validate and certify their credible usage or application before their use.
 - (8) Special Requirements. Discuss requirements for any significant non-instrumentation capabilities and resources such as: special data processing/data bases, unique mapping/charting/geodesy products, extreme physical environmental conditions or restricted/special use air/sea/landscapes.
 - (9) Test and Evaluation Funding Requirements. Estimate, by Fiscal Year and appropriation line number (program element), the funding required to pay direct costs of planned testing. State, by fiscal year, the funding currently appearing in those lines (program elements). Identify any major shortfalls.
 - (10) Manpower/Personnel Training. Identify manpower/personnel and training requirements and limitations that affect test and evaluation execution.
- b. The TEMP shall project the key resources necessary to accomplish demonstration and validation testing and early operational assessment. The TEMP shall estimate, to the degree known at Milestone ***B***, the key resources necessary to accomplish developmental test and evaluation, live fire test and evaluation, and operational test and evaluation. These shall include elements of the National Test Facilities Base (which incorporates the Major Range and Test Facility Base (MRTFB), capabilities designated by industry and academia, and Major Range and Test Facility Base test equipment and facilities), unique instrumentation, threat simulators, and targets. As system acquisition progresses,

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the preliminary test resource requirements shall be reassessed and refined and subsequent TEMP updates shall reflect any changed system concepts, resource requirements, or updated threat assessment. Any resource shortfalls which introduce significant test limitations shall be discussed with planned corrective action outlined.

6. Annex A--BIBLIOGRAPHY

- a. Cite in this section all documents referred to in the TEMP.
- b. Cite all reports documenting technical, live fire, and operational testing and evaluation.

7. Annex B-ACRONYMS. List and define acronyms used in the TEMP.

8. Annex C-POINTS OF CONTACT. Provide a list of points of contact as illustrated by Figure 2.

8. ATTACHMENTS. Provide as appropriate.

Figure 1, Deleted

FIGURE 2 - PROGRAM POINTS OF CONTACT (FORMAT)

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TELEPHONE (COMMERCIAL/DSN)</u>
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Service Secretary/Agency Director Monitor/Coordinator		
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User Representative		
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Program Manager		
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Development Test Director/Coordinator		
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Operational Test Director/Coordinator		
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OUSD(AT&L)

D, OT&E Action Officer	OSD, D, OT&E	
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Appendix IV

Live Fire Test and Evaluation Reports Mandatory Procedures & Formats

Introduction and Purpose

This Appendix provides guidelines to describe a disciplined management approach for the conduct of Live Fire Test and Evaluation (LFT&E), within the Department of Defense (DoD), which, if followed, will ensure compliance with LFT&E legislation. Section 2366, Title 10, United States Code (USC), contains requirements for vulnerability and lethality Live Fire Testing of covered systems, major munitions programs, and product improvements to covered systems and major munitions programs. The guidelines describe the objective and scope of LFT&E, provide guidance for LFT&E planning, testing, evaluation and documentation, and discuss the responsibilities of LFT&E principals.

The objective of LFT&E is to provide a timely and reasonable assessment of the vulnerability/lethality of a system as it progresses through its development and prior to full-rate production. In particular:

1. to provide information to decision-makers on potential user casualties, vulnerabilities, and lethality, taking into equal consideration susceptibility to attack and combat performance of the system;
2. to ensure that knowledge of user casualties and system vulnerabilities or lethality is based on testing of the system under realistic combat conditions;
3. to allow any design deficiency identified by the testing and evaluation to be corrected in design before proceeding beyond low-rate initial production; and
4. to assess battle damage repair capabilities and issues (while assessment of battle damage repair capability is not a statutory requirement of LFT&E, test officials should exploit opportunities presented by LFT&E to assess such capabilities whenever prudent and affordable).

Definitions

The legislation covering LFT&E also provides definitions of “covered system,” “major munitions program,” “covered product improvement programs,” “realistic survivability testing,” “realistic lethality testing,” and “configured for combat.” The following definitions are not given in that legislation but are provided here to permit a better understanding of LFT&E requirements:

1. *Full-up Test*: A vulnerability test conducted on a complete or partial system loaded or equipped with all dangerous materials (including flammables and explosives) that would normally be on board in combat (configured for combat). All critical subsystems, which could contribute to the test outcome, must be operating (e.g., hydraulic and electrical power) under realistic conditions. For lethality testing, the

munitions or missile must be production-representative. The target must be representative of the class of systems that includes the threat, and be sufficiently realistic to demonstrate the lethal effects the weapon is designed to produce. This testing alone may not satisfy 10 USC, Section 2366. See definition 4.

2. *System-Level Test*: A test conducted on the complete system, but may or may not be a Full-up test. This testing alone may not satisfy 10 USC, Section 2366. See paragraph 4, below.

3. *Live Fire Test*: A test within the OSD approved LFT&E strategy that involves the firing of actual munitions at target components, target sub-systems, target sub-assemblies or system-level targets (which may or not be configured for combat) to examine personnel casualty, vulnerability and/or lethality issues. This testing alone may not satisfy 10 USC, Section 2366; see definition 4.

4. *Full-up, System-Level Test*: A LFT&E Strategy for a covered system, major munitions program, or missile program, or covered product improvement program shall include Full-up, System-level tests. The term “Full-up, System-level Test” is that testing that fully satisfies the statutory requirement for “realistic survivability testing” or “realistic lethality testing” as defined in Section 2366, Title 10, USC.

5. *Survivability*: The capability of a system and crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission.

6. *Vulnerability*: The characteristic of a system that causes it to suffer a definite degradation (loss or reduction of capability to perform its designated mission) as a result of having been subjected to a certain (defined) level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability.

7. *Lethality*: The ability of a munition (or laser, high power microwave, etc.) to cause damage that will cause the loss or a degradation in the ability of a target system to complete its designated mission(s).

8. *Susceptibility*: The degree to which a weapon system is open to effective attack due to one or more inherent weakness. (Susceptibility is a function of operational tactics, countermeasures, probability of enemy fielding a threat, etc.) Susceptibility is considered a subset of survivability.

Implementation

An active, well-planned, well-managed and well-executed LFT&E strategy is essential to understanding system vulnerability/lethality and shall be an essential element of the information supporting decisions regarding the acquisition of materiel as well as the development of doctrine for its proper tactical employment. The LFT&E strategy for a given system shall be developed as soon as possible after Milestone **B**, and be structured and scheduled so that any design changes, resulting from that testing and analysis, as described in the strategy, may be incorporated before proceeding beyond low-rate initial production. LFT&E considerations must be included in all phases of the weapon system acquisition cycle, beginning with concept exploration and **continued**

throughout the acquisition process. Furthermore, the LFT&E strategy must be managed, including planning and programming, in such a manner that all elements of the test and evaluation process are well-integrated and complementary. The availability of facilities, test sites, instrumentation, personnel, threat targets, munitions, and/or directed energy weapons shall be managed throughout all phases of the budget cycle.

LFT&E shall be initiated as early as possible and completed before production and deployment to identify and assess possible design deficiencies so that appropriate corrective actions can be taken. Beginning with component-level testing and analysis during concept demonstration and validation, live fire vulnerability/lethality test and evaluation continues through System Development and Demonstration with additional components/subsystem testing, and progresses to Full-up System Level LFT&E of production representative items before the system proceeds beyond low-rate initial production.

The LFT&E strategy shall be structured to provide a timely and reasonable examination and understanding of the vulnerability/lethality of U.S. weapon systems and munitions/directed energy weapons to the full spectrum of validated combat threats/targets. Subsequent product improvements to covered systems/major munitions programs meeting the statutory criteria are also required to undergo LFT&E if there is a significant impact to vulnerability or lethality. If any doubt exists, the system shall be assumed to be covered and appropriate action taken. This includes waiver action if the testing would be unreasonably expensive and impractical. Legal counsel shall be consulted to verify the final determination of program status. All LFT&E is conducted by the Services with OSD oversight. Non-Developmental Items (NDI) and Advanced Technology Demonstrators/Prototypes that meet the definition of covered system/major munitions program are also required to undergo LFT&E.

LFT&E of all systems shall be predicated upon the DoD Intelligence Community's official assessment of the principal threat systems and capabilities an adversary might reasonably bring to bear in an attempt to defeat or degrade a specific U.S. system as described in the validated threat document.

Vulnerability and lethality assessments may require the use of validated modeling/simulation and other analytic techniques. Where modeling/simulation and other analytical efforts are essential elements in a LFT&E strategy, pre-shot predictions shall be included.

The generation of data to resolve critical LFT&E issues in an efficient and cost effective manner to represent realistic environments shall be of paramount concern in the shot-line selection process for live-fire testing. While an element of randomness in shot-line selection is often desirable, total reliance on complete randomness may neither be consistent with the test objectives nor be an efficient use of test resources. Random shot-lines are generated from a realistic distribution of hit points, to include such factors as the weapon system operator, target signatures and weapon seeker characteristics. In most cases a mixture of random shot-lines (shot-lines generated from likely hit points) and engineering shot-lines (i.e., shot-lines specifically selected by the evaluator to address specific vulnerability/lethality issues) shall be appropriate. It is required that some portion of the total shots be randomly drawn from a combat distribution of likely hit points, when known.

Although the evaluation of live-fire test results will address kill given a hit (i.e., vulnerability or lethality), the outcome of LFT&E shall not necessarily be expressed in terms of probabilities. Rather, Live Fire Testing shall address vulnerability or lethality primarily by examining basic damage and kill mechanisms and their interactions with the target system. Further, the evaluation of vulnerability test results shall address, where possible, the susceptibility of the system.

Although LFT&E programs may differ significantly in scope and timing, the level of maturity at various stages of the acquisition process is basically the following: By Milestone **B**, a decision shall be made whether the system meets the legislative criteria for a covered system/major munitions program. Initial draft strategies shall identify proposed issues, existing data in support of the issues, and Live Fire Tests to be conducted throughout the acquisition process. By Milestone **B**, the TEMP must contain a mature strategy. In particular, the strategy must either commit to Full-up, System-Level, Live Fire Testing, or a waiver request and alternative LFT&E plan must have been submitted and approved. The entire LFT&E program, to include testing, evaluation, and reporting, must be completed **by Full-Rate Production Decision**.

Responsibilities

Director, Operational Test and Evaluation (D, OT&E):

1. Serves as the OSD focal point for review, coordination, and approval of LFT&E policy.
2. Approves LFT&E strategies, as provided in the TEMP (TEMP).
3. Approves candidate systems for LFT&E. Annually reviews all potential systems for inclusion or exclusion from the LFT&E oversight list.
4. Approves Services' Detailed LFT&E Plans identified for D, OT&E approval per the matrix of LFT&E phases included in the TEMP.
5. Reviews Services' Detailed LFT&E plans for those phases not requiring D, OT&E approval.
6. Reviews Services' LFT&E Reports.
7. Monitors the Services' LFT&E program during its conduct.
8. Conducts an assessment of individual Services' LFT&E programs (to include LFT&E programs conducted under the waiver provisions of Section 2366, Title 10, U.S. Code) and prepares the Secretary of Defense LFT&E assessment report to Congress.

DoD Components:

1. Recommend candidate systems for LFT&E.
2. Develop and implement the LFT&E strategy for each affected system and ensures this strategy is fully described in the TEMP.
3. Plan, program, and budget research, development, test and evaluation and other procurement funds in support of LFT&E including the acquisition of threat targets/munitions or acceptable surrogates.
4. Identify critical LFT&E issues, prepare and approve required plans, reports and other documentation.
5. Permit on-site monitoring of all LFT&E tests by D, OT&E.

6. Conduct engineering assessments of possible design changes resulting from LFT&E and develop programs for incorporating cost effective design changes as early as possible commensurate with the system acquisition strategy.
7. Prepare request for waiver from Full-up, System-Level, Live Fire Testing if such testing is unreasonably expensive and impractical. Prepare alternative plans for evaluating the vulnerability or lethality of the system for inclusion with the request for waiver. Waiver authority resides in the **USD(AT&L)** for ACAT I D programs, and in the Component Acquisition Executive for less-than-ACAT I D programs.
8. Manage Service facilities, resources and provide guidance on operating these test facilities to support LFT&E.

LFT&E Documents

Conduct of LFT&E shall require the preparation and submission to OSD of the following documents.

TEMP: (See also Appendix III, "TEMP"). The TEMP summarizes where, when, and how the LFT&E issues will be tested/evaluated. Specific LFT&E items considered for inclusion in the TEMP are: a description of the overall Live Fire Test and Evaluation strategy for the item; critical Live Fire Test and Evaluation issues; required levels of system vulnerability/lethality; the management of the Live Fire Test and Evaluation program; Live Fire Test and Evaluation schedule, funding plans and requirements; related prior and future Live Fire Test and Evaluation efforts; the evaluation plan and shot selection process; Modeling and Simulation strategy and VV&A; and major test limitations for the conduct of Live Fire Test and Evaluation. Live Fire Test and Evaluation resource requirements (including test articles and instrumentation) shall be appropriately identified early in the development cycle and appear in the Test and Evaluation Resource Summary. The TEMP shall include a matrix that covers all tests within the LFT&E strategy, their schedules, the issues they will address and which planning documents the Services propose for submission to D, OT&E for approval and which are proposed to be submitted for information and reviews only.

Detailed Test and Evaluation Plan: This document describes the detailed test procedures, test conditions, data collection and analysis processes to be used during the conduct of each Live Fire Test. Annex B provides additional detail on the content of the Detailed Test and Evaluation Plans required for the Full-up System Level Live Fire Tests. The Detailed Test and Evaluation Plan shall be submitted to D, OT&E for comment at least 30 days before test initiation. D, OT&E shall have 15 days for submission of comments subsequent to its receipt of the Detailed Test Plan/ Evaluation Plan.

Detailed Test and Evaluation Report: The results and overall evaluation of all testing, identified in the LFT&E strategy, shall be documented by the Service and submitted to D, OT&E no later than 120 days after test completion. The format of the Report(s) is a Service option; however, to facilitate the D, OT&E independent report to Congress, each Service report shall include the firing results, test conditions, a description of any deviations approved subsequent to the preparation of the Detailed Test and Evaluation Plan, test limitations, conclusions, and the evaluation of live fire vulnerability/lethality based on available information (if applicable). D, OT&E shall have 45 days, from receipt of the final Service Detailed Test and Evaluation Report, for

preparation and transmittal of the SecDef assessment report to Congress. Service technical review is normally requested prior to transmittal.

Additional documentation may be prepared as part of the developmental process to support engineering tests that bear on the Live Fire Test Assessment. Review and approval of this documentation shall be at the Service level.

Waivers

As delegated by the Secretary of Defense, waivers from Full-Up, System-Level LFT&E are approved prior to Milestone **B by the USD(AT&L)**, for ACAT ID programs, or by the appropriate CAE, for less than ACAT ID programs, provided the requirements of Section 3.4.9 of this **Memorandum** are met. With the exception of the requirements for Full-up, System-Level, Live Fire Testing, the requirements for waived LFT&E programs are no less stringent than for non-waived programs, to include the inclusion of an LFT&E strategy in the TEMP and an independent D, OT&E assessment report to Congress. Waivers from Full-up, System-Level, Live Fire Testing (realistic survivability/lethality testing as defined in Section 2366, Title 10, USC), for covered systems/major munitions programs, including product improvements that significantly affect vulnerability or lethality, cannot be granted after Milestone **B**, except through legislative relief.

ANNEX A REFERENCES

1. Section 2366, Title 10, United States Code, "**Major Systems and Munitions Programs: Survivability and Lethality Testing Required before Full-Scale Production**".
2. Department of Defense Directive 5000.1, ***The Defense Acquisition System.*** |

ANNEX B
DETAILED LIVE FIRE TEST AND EVALUATION PLAN
Mandatory Content

The following paragraphs outline the mandatory content of the Detailed Live Fire Test and Evaluation Plan. No standard format is prescribed, but the Plan must contain at least the following information:

1. A cover page providing the name of the system, the activity/agency responsible for preparation of the Plan, date, classification, and applicable distribution statement.
2. A coordination sheet containing signatures of Service approval authorities.
3. Administrative information: name, organization, telephone, and E-Mail addresses of key LFT&E personnel.
4. Description of threat weapons or targets that the system is expected to encounter during the operational life of the system, and the key characteristics of these threats/targets that affect system vulnerability/lethality; a reference to the specific threat definition document or authority; a discussion of the rationale and criteria used to select the specific threats/targets and the basis used to determine the number of threats/targets to be tested and evaluated in LFT&E.
5. If actual threats/targets are not available, then the plan must describe the threat/target surrogate to be used in lieu of the actual threat/target, and the rationale for its selection.
6. A statement of the test objectives in sufficient detail to demonstrate that the evaluation procedures are appropriate and adequate.
7. A description of the specific threats/targets to be tested including a detailed configuration and stowage plan (to include payload configuration) for each shot. Describe the rationale or operational scenarios on which the target configuration/stowage was based.
8. A listing of any differences between the system to be tested and the system to be fielded. As specifically as possible, identify the degree to which test results from the tested configuration are expected to be representative of the vulnerability or lethality of the fielded systems.
9. Identification of any test limitations, particularly any potential loss of realism from absence of components, arising from the use of surrogates, from the inserting of fuzes on stowed ammunition, or any other environmental, safety or resource constraints. Identify the impact of these limitations on test results.

10. A description of the shot selection process. Describe the process to be used to establish the test conditions for randomly selected shots, including any rules ("exclusion rules) used to determine whether a randomly generated shot may be excluded from testing. For engineering shots (i.e., shots selected to examine specific vulnerability/lethality issues), describe the issue and the associated rationale for selecting the specific conditions for these shots. List the specific impact conditions and impact points for each shot, and whether it is a random or engineering shot.

11. A detailed description of the test approach, test setup, test conditions, firing procedures, damage assessment and repair process, planned test sequence, instrumentation, data collection and analysis procedures, and responsibilities for collecting and documenting test results. Include any standard forms that will be used to document test results.

12. A prediction of the anticipated results of each shot. These predictions may be based on computer models, engineering principles, or engineering judgment. Detail shall be consistent with the technique used for casualty/damage prediction.

13. A detailed description of the analysis/evaluation plan for the Live Fire Test. The analysis/evaluation plan must be consistent with the test design and the data collected. Indicate any statistical test designs used for direct comparisons or for assessing any pass/fail criteria.

14. A general description, including applicable references, of any vulnerability/lethality models to be used to support shot-line selection, pre-shot predictions, or the analysis/evaluation. This material shall include a discussion of model algorithm or input limitations, as well as references to the sources of key model inputs.

15. A detailed description of the approach to analyzing and mitigating the potential environmental impacts, consequences, or effects of the test activities, unless adequately described elsewhere.

Appendix V

**Major Automated Information System Quarterly
Reporting
Mandatory Procedures & Formats**

[Deleted]

Appendix VI

Earned Value Management Systems Criteria Mandatory Procedures & Reporting

Introduction and Purpose

This Appendix provides mandatory procedures to ensure proper implementation of Earned Value Management Systems (EVMS) Criteria. The contractors' management control systems shall include policies, procedures and methods that are designed to ensure that they will accomplish the considerations reflected herein.

Organization

- a. Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.
- b. Identify the program organizational structure including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.
- c. Provide for the integration of the company's planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.
- d. Identify the company organization or function responsible for controlling overhead (indirect costs).
- e. Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.

Planning, Scheduling, and Budgeting

- a. Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.
- b. Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.
- c. Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Budget for far-term efforts may be held in higher level accounts until an appropriate time for allocation at the control

account level. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work. On government contracts, if an over target baseline is used for performance measurement reporting purposes, prior notification must be provided to the customer.

- d. Establish budgets for authorized work with identification of significant cost elements (labor, material, etc.) as needed for internal management and for control of subcontractors.
- e. To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.
- f. Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.
- g. Identify and control level of effort activity by time-phased budgets established for this purpose. Only that effort which is unmeasurable or for which measurement is impractical may be classified as level of effort.
- h. Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs.
- i. Identify management reserves and undistributed budget.
- j. Provide that the program target cost goal is reconciled with the sum of all internal program budgets and management reserves.

Accounting Considerations

- a. Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.
- b. When a work breakdown structure is used, summarize direct costs from control accounts into the work breakdown structure without allocation of a single control account to two or more work breakdown structure elements.
- c. Summarize direct costs from the control accounts into the contractor's organizational elements without allocation of a single control account to two or more organizational elements.
- d. Record all indirect costs which will be allocated to the contract.
- e. Identify unit costs, equivalent units costs, or lot costs when needed.
- f. For EVMS, the material accounting system will provide for:

(1) Accurate cost accumulation and assignment of costs to control accounts in a manner consistent with the budgets using recognized, acceptable, costing techniques.

(2) Cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of progress payments or actual receipt of material.

(3) Full accountability of all material purchased for the program including the residual inventory.

Analysis and Management Reports

a. At least on a monthly basis, generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system:

(1) Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides the schedule variance.

(2) Comparison of the amount of the budget earned and the actual (applied where appropriate) direct costs for the same work. This comparison provides the cost variance.

b. Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

c. Identify budgeted and applied (or actual) indirect costs at the level and frequency needed by management for effective control, along with the reasons for any significant variances.

d. Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the contract.

e. Implement managerial actions taken as the result of earned value information.

f. Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.

Revisions and Data Maintenance

a. Incorporate authorized changes in a timely manner, recording the effects of such changes in budgets and schedules. In the directed effort prior to negotiation of a change,

base such revisions on the amount estimated and budgeted to the program organizations.

- b. Reconcile current budgets to prior budgets in terms of changes to the authorized work and internal replanning in the detail needed by management for effective control.
- c. Control retroactive changes to records pertaining to work performed that would change previously reported amounts for actual costs, earned value, or budgets. Adjustments shall be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data.
- d. Prevent revisions to the program budget except for authorized changes.
- e. Document changes to the performance measurement baseline.